
JOINT USERS RESOURCE ALLOCATION PLANNING
(JURAP) MEETING
APRIL 19, 2001

Jet Propulsion Laboratory
California Institute of Technology

4800 Oak Grove Drive
Pasadena, CA 91109-8099

(818) 354-4321

May 16, 2001
Refer to: 930–01–008–ESB:lc

TO: Distribution

FROM: Eugene S. Burke

SUBJECT: Minutes for the Joint Users Resource Allocation Planning Committee Meeting held April 19, 2000.

NEXT JURAP MEETING:
Thursday, May 17, 2001
JPL Bldg. 171, Room 218 B 1:00 p.m.

We have instituted a simple Teleconference capability for non-JPL numbers. You may call (818) 354-2626, if you wish to participate in this manner.

Attendees:

C. Abramo
R. Bartoo
R. Benson
E. Burke
A. Chang
B. Compton
J. Hall
J. Hodder
D. Holmes
K.Kim
N. Lacey
E. Leurs
K. Martinez
W. Martin
M. Medina
J. Miller
D. Morris
R. Mutel
P. Poon
M. Slade
P. Tay
J. Taylor
J. Valencia
I. Webb
B. Williams

The Joint Users Resource Allocation Planning Committee meets monthly to review the status of Flight Projects and the requirements of other resource users, and to identify future requirements and outstanding conflicts. The last regular meeting was held on April 19, 2001 at the Jet Propulsion Laboratory.

Introductory Remarks - E. Burke

Gene introduced and welcomed special guests R. Mutel from the University of Iowa (Cluster project); Ed Hirst, Genesis mission Manager; and Bobby Williams, NEAR Chief Navigator.

SPECIAL REPORTS

Genesis – Ed Hirst

Genesis plans to launch on July 30, 2001 from Kennedy Space Center by a Delta II, three-stage launch vehicle. In part, the Genesis mission objective is to capture and return solar wind samples for analysis. The mission's duration is approximately 3.1 years, which includes a 22-month solar wind sample collection science requirement. Return to earth activities are planned to start April 2004, with Earth reentry and sample capsule recovery planned for September 2004.

Cluster II Wideband Data – R. Mutel

The first launch attempt of the Cluster spacecraft (Cluster I) occurred in June 1996, from French Guyana. A software error 40 seconds after liftoff caused a change in the planned flight path of the Ariane 5 booster resulting in automatic self-destruction and total loss of the mission. Four years later, in the summer of 2000, the four Cluster II spacecrafts were successfully launched into orbit by two Soyuz rockets. The Cluster spacecraft payload is comprised of eleven science instruments. The University of Iowa is the prime investigator for the Wideband Data Plasma Wave Instrument (WBD). The WBD investigation provides high time resolution multi-spacecraft measurements of electric and magnetic field waveforms, utilizing a high rate downlink of 220 Kb/s to the Deep Space Network (DSN). Identical WBD instruments are mounted on all four spacecraft.

NEAR Shoemaker Special Report – B. Williams

The Near spacecraft controlled descent and the subsequent landing on EROS was successful. Landing occurred on February 12, 2001 at approximately 20:02:10 UTC (Earth received time). One-way light time is 17 minutes 34.5 seconds. Favorable conditions after landing allowed instrument operations, which prompted extended DSN support. Data was successfully returned from the gamma ray spectrometer and magnetometer instruments. The spacecraft was reconfigured for hibernation on the final track that ended at 0000Z on 2/28/01.

DSN Operations – J. Hodder

The DSN performance was lower than usual during this reporting period. Statistics are included in the presentation material.

Resource Analysis Team - K. Kim for F. Leppla

On-going activities include MADB/TIGRAS testing and training, Deep Impact, Image, and Genesis load studies. Week 24 schedule was released to the DSN April 09, 2001. Week 25 schedule was released April 23, 2001. Week 35 through 37 will enter the negotiation process May 01, 2001.

DSS Downtime Forecast – J. Valencia

The requested downtime for DSS 14 Antenna Controller Replacement task is in the Downtime Forecast schedule as a proposal only. A formal contention and recommendation plan will be submitted for consideration at the next scheduled RARB meeting.

Downtime for DSS 43 and DSS 63 Antenna Controller Replacement task is being worked. Currently, there are no proposals, but timeframes in 2005 are being considered.

Goldstone Solar System Radar - M. Slade

Observations of Near-Earth Asteroids 1998 SF36 and 2000 EC16 in March 2001 were all successful. Asteroid 1998 SF36 was selected as the mission target to land on and return a sample for the joint Japanese/NASA MUSES-C mission. Arecibo to Goldstone radar interferometric observations of Venus was successfully performed on April 15, 2001. Additional Arecibo to GDSCC observations of Venus is scheduled for April and May 2001.

Radio Astronomy / Special Activities - G. Martinez

Two Time and Earth Motion Precision Observations (TEMPO) were supported in March, with 100% of data time utilized. Two Cat M & E observations were successfully supported in March, with 98% of data time utilized.

In support of the Gravity Probe-B mission, DSS 14 and DSS 43 supported an X-band dual polarization prelaunch guidestar survey with 91.5% of data time utilized.

FLIGHT PROJECTS REPORTS

Chandra - G. Wright

No report

Image – R. Dutilly, GSFC

IMAGE operations are nominal. The project expressed concern about recent DSN site hardware failures.

Stardust - R. Ryan

The spacecraft is healthy and is presently at 0.47 AU from Earth. DSN support has generally been good this reporting period. The Navigational Camera (NAVCAM) calibration activities are ongoing. Some additional contamination of the camera optics was observed during the calibration process in February. A longer-term heating cycle appears to have improved the optics clarity, but not to pre-launch standard. Heavy solar activity has been a concern, however the spacecraft has not been affected.

Voyager – I. J. Hall

Voyager 1 and Voyager 2 status is nominal and overall DSN support is good. Voyager 1 heliocentric distance is 80.8 AU with a RTLT of approximately 22h 14m. Voyager 2 heliocentric distance is 63.7 AU with a RTLT of approximately 17h 38m.

Cassini - D. Doody

Cassini operations are nominal. The DSN continues to provide excellent support, particularly with the recent Radio Science Ka-band tests. Minor spacecraft instrument anomalies and recoveries are worked in near-real-time. The Huygens Probe link anomaly resolution requires additional S-band Uplink tests with the DSN. Preparation for the Gravitational Wave Systems tests planned for May through August 2001 is ongoing.

U. S. Space VLBI - V. Altunin

No report

Mission Management Office (MMO) - E. Brower

MGS Flight Operations, Science instruments, and Flight Support systems remain green.
MER site imaging began February 19, 2001 and Radio Science egress scans started April 4, 2001. Upcoming events include a thruster/fuel strategy review planned for May 1, 2001, a UHF test planned for June, and the second extension proposal tentatively planned for June 15. Presently, MGS is unable to submit firm requests for future DSN coverage requirements because support requirements for Mars 2001 Odyssey mission are not clear.

Ulysses - I. J. Webb

Spacecraft operations are normal. The spacecraft began its second orbit around the sun and is currently in nutation operations. Instrument calibrations and reconfigurations are performed as required. A number of equipment failures were experienced during this reporting period. On DOY 088, DSS 24 was declared RED due to an Azimuth wheel bearing failure. The track was moved to DSS 14 and was successfully supported. On DOY 093 DSS 34 experienced uplink command perturbations causing an increase in nutation from .05 to .2 degrees. Recovery time was approximately 10 hours. On DOY 104 DSS 54 experienced a transmitter failure. The transmitter problem was fixed and the uplink was reestablished approximately 1 hour and 45 minutes later.

International Solar Terrestrial Program (ISTP) – R. Dutilly, GSFC

POLAR operations are nominal and the POLAR flip activities performed on DOY 083 were successfully completed. UPL command testing with the 34-meter system has been successful.

SOHO operations are nominal and the project is in continuous operations. The maneuver performed last month was successful. UPL command testing with the 34-meter system has been successful. DSN site hardware failures are of concern during continuous operations.

WIND operations are nominal. The spacecraft maneuver performed in April was successful. UPL command testing with the 34-meter system has been successful.

Galileo – B. Compton

OTM-93, planned for March 16 was cancelled. Two scheduled DSS 43 passes were cancelled due to a work action at Canberra. The real-time science buffer dump-to-tape strategy and the Ganymede 29-encounter data playback were successful. Next significant event is the Callisto encounter planned for May 25, 2001.

Deep Space 1 (DS1) – J.Taylor

The project began uplinking the flight software version M6F3 on March 5, 2001. The spacecraft was successfully commanded to reboot to the new flight software on March 13. A number of DSN support problems were experienced during this reporting period. An X-band transmitter failure at DSS 43 forced the project to replan the mid-week track activities to meet its command and telemetry support requirements. On March 11, DSS 15 was late in providing command uplink support. The problem (procedural) was caused by an incorrect uplink polarization configuration. DSS 15 switched from left circular polarization (LCP) to right circular polarization (RCP) to correct the problem.

Advanced Composition Explorer (ACE) - R. Sodano

ACE operations are nominal and the spacecraft maneuvers performed in March were all successful. Command testing with the 34-meter system was considered successful. Goddard continues to push to have the CAST tool available for its schedulers. Goddard cites they require training, and they need accounts established for schedulers so they can close this open issue.

The next JURAP meeting will be held:
Thursday, May 17, 2001 at JPL
in Bldg. 171, Room 218 at 1:00 p.m.

Two Special Reports will be presented: S-Band Frequency, by T. Peng; and Detection of Neutrino-Induced Microwave Pulses with the DSN, by D. Saltzbert (UCLA)

ACE

Afkhami, F. . . . . GSFC m/s 428.2
Machado, M. J. . . . . GSFC m/s 428.2
Myers, D. A. . . . . GSFC m/s 428.2
Sodano, R. J. . . . . GSFC m/s 581.0

Canberra Deep Space Communications Complex

Churchill, P. . . . . CDSCC
Jacobsen, R. . . . . CDSCC
O'Brien, J. J. . . . . CDSCC
Ricardo, L. . . . . CDSCC
Robinson, A. . . . . CDSCC
Wiley, B. . . . . CDSCC

Cassini

Arroyo, B. 264-235
Chin, G. E 230-310
Doody, D. F. 230-310
Frautnick, J. C. 230-301
Gustavson, R. P. 230-301
Maize, E. H. 230-104
Mitchell, R. T. (PM) 230-205
Webster, J. L. 230-104

Chandra

Gage, K. R. . . . . SAO
Lavoie, A. R. (PM) . . . . . MSFC Org. FD03
Marsh, K. . . . . SAO
Weisskopf, M. C. (PS) . . . . . MSFC Org. SD50
Wicker, D. . . . . SAO
Wright, G. M. . . . . MSFC Org. FD03

Deep Space 1

Hunt, J. C. 230-207
Moyd, K. I. 230-207
Rayman, M. D. (PM) 230-207
Tay, P. 264-235
Yetter, K. E. 264-235

Europa Orbiter

Ludwinski, J. M. 301-335
Simpson, K.A. 301-335

Galileo

Compton, B. 230-102
Huynh, J. C. 230-102
McClure, Jr., J. R. 230-102
Medina-Gussie, M. 301-371
Paczkowski, B. G. 230-260
Pojman, J. L. 238-538
Theilig, E. E. (PM) 264-525

Genesis

Arroyo, B. 264-235
Burnett, D. S. . . . . CIT 170-25
Hirst, E. A. 301-180
Sasaki, C. N. (PM) 264-370
Sweetnam, D. N. 264-370
Tay, P. 264-235
Yetter, K. E. 264-235

Goldstone Deep Space Communications Complex

Holmgren, E. DSCC-25
Massey, K. DSCC-61
McConahy, R. DSCC-33
McCoy, J. DSCC-57
Mischel, D. DSCC-37
Sturgis, L. DSCC-33

Goldstone Orbital Debris Radar (GODR)

Goldstein, R. M. (PM) 300-227

Goldstone Solar System Radar (GSSR)

Haldemann, A. F. 238-420
Hills, D. L. 238-420
Ostro, S. J. (PS) 300-233
Slade, III, M. A. (PM) 238-420
Wolken, P. R. 507-105

Gravity Probe-B

Keiser, M. (PS) . . . . . Stanford Univ.
Shapiro, Prof. I. I. . . . . Harvard Univ.

IMAGE

Abramo, C. A. 507-120
Burley, R. J. . . . . GSFC m/s 632.0
Green, J. L. . . . . GSFC m/s 630

ISTP (Cluster II)

Abramo, C. A. 507-120
Chang, A. F. 264-844
Christensen, J. L. . . . . GSFC m/s 404.0
Dutilly, R. N. . . . . GSFC m/s 581.1
Gurnett, D. . . . . U. of Iowa
Mahmot, R. E. (Acting PM) . . . . . GSFC m/s 444.0
Pickett, J. . . . . U. of Iowa

ISTP (GEOTAIL/POLAR/SOHO/WIND)

Abramo, C. A. 507-120
Alexander, H. 502-320
Bush, R. I. . . . . Stanford Univ.
Carder, M. E. . . . . GSFC 450.C
Chang, A. F. 264-844
Dutilly, R. N. . . . . GSFC m/s 581.1
Hearn, S. P. . . . . GSFC m/s 450.C
Johnston, S. S. . . . . GSFC m/s 444.0
Mahmot, R. E. . . . . GSFC m/s 444.0
Milasuk-Ross, J. . . . . GSFC m/s 428.5
Miller, K. A. . . . . GSFC m/s 450.C
Mish, W. H. . . . . GSFC m/s 690.0
Nace, E. M. . . . . GSFC m/s 450.8
Pukansky, S. M. . . . . GSFC m/s 450.C

IPN-ISD / General

Coffin, R. C. 303-400
Doms, P. E. 303-400
Polansky, R. G. 303-400
Squibb, G. F. 303-400
Stelzried, C. T. 303-407

IPN-ISD / Mission Management Office

Rosell, S. N. 264-235
Varghese, P. 264-235

IPN-ISD/ DSMS Engineering

Freiley, A. J. 303-404
Kimball, K. R. 303-404
Klose, J. C. 303-404
Kurtik, S. C. 303-210
Osman, J. W. 303-210
Sible, Jr., R. W. 303-404
Statman, J. I. 303-404

IPN-ISD/ DSMS Operations

Almassy, W. T. 502-420
Covate, J. T. 507-120
Dillard, D. E. 507-120
Frazier, R. 507-120
Gillam, I. T. 502-400
Green, J. C. 507-120
Hodder, J. A. 303-403
Knight, A. G. 507-120
Landon, A. J. 507-105
Martinez, G. 507-120
Nevarez, R. E. 502-400
Recce, D. J. 303-403
Roberts, J. P. 502-400
Salazar, A. J. 303-403
Schroeder, H. B. 507-120
Short, A. B. 507-120
Wackley, J. A. 303-403
Waldherr, S. 507-120
Watzig, G. A. 502-420
Wert, M. 502-420

IPN-ISD/ DSMS Plans & Commitments

Abraham, D. S. 303-402
Altunin, V. I. 303-402
Bathker, D. A. 303-402
Benson, R. D. 264-844
Berman, A. L. 264-844
Beyer, P. E. 264-844
Black, C. A. 303-402
Cesarone, R. J. 303-402
Chang, A. F. 264-844
Gillette, R. L. 264-844
Griffith, D. G. 303-402
Holmes, D. P. 264-844
Kazz, G. J. 303-402
Luers, E. B. 303-402
Miller, R. B. 303-402
Peng, T. K. 303-402
Poon, P. T. 264-844
Slusser, R. A. 264-844
Wessen, R. R. 264-844
Yetter, B. G. 264-844

IPN-ISD / DSMS RAPSO

Bartoo, R. H. 301-285
Borden, C. S. 301-165
Burke, E. S. 303-403
Caputo, R. 514-200
Hampton, E. 600-174
Hincy, W. 600-174
Hungerford, R. M. 301-285
Kehrbaum, J. M. 301-180
Kim, K. 600-174
Lacey, N. 600-174
Leppla, F. B. 600-174
Lineaweaver, S. 600-174
Martinez, K. A. 600-174
Morris, D. G. 303-403
Valencia, J. 600-174
Wang, Y-F. 301-165
Zendejas, S. C. 301-165

JPL/General

Burgess, L. N 230-107
Burton, M. E. 169-506
Finley, S. G. 11-116
Gershman, R. 264-440
Holladay, J. A. 303-404
Jurgens, R. F. 238-420
Kahn, P. B. 301-486
Kliore, A. J. 161-260
Kobrick, M. 300-233
Moore, W. V. 161-260
Morabito, D. D. 161-260
Naudet, C. J. 238-600
Resch, G. M. 238-600
Robbins, P. E. 161-260
Silva, A. 149-200
Smith, J. L. 301-180
Taylor, A. H. 264-538
Toyoshima, B. 301-276
Winterhalter, D. 169-506
Woo, H. W. 126-110
Yung, C. S. 238-808

Madrid Deep Space Communications Complex

Chamarro, A. . . . . MDSCC
Rosich, A. . . . . MDSCC

MAP

Abramo, C. A. 507-120
Citrin, E. A. (PM) . . . . . GSFC m/s 410.2
Coyle, S. E. . . . . GSFC m/s 581.0
Dew, H. C. . . . . GSFC m/s 423.0

Mars Exploration Rover (MER A & B)

Adler, M. T-1723
Arroyo, B. 264-235
Chadbourne, P. 230-207
Crisp, J. A. (PS) 241-105
Erickson, J. K. T-1723
Roncoli, R. B. 301-140L
Theisinger, P. C. (PM) 301-455

Mars Express Orbiter
Horttor, R. L. (PM) 238-540
Thompson, T. W. 300-227

Mars Global Surveyor
Arroyo, B. 264-235
Brower, E. E. 264-235
Thorpe, T. E. (PM) 264-214
Yetter, K. E. 264-235

Mars Program Office
Cutts, J. A. 264-426
Jordan, Jr., J. F. 264-472
McCleese, D. J. 264-426
Naderi, F. M. 264-438

Mars Reconnaissance Orbiter Project
Arroyo, B. 264-235
Graf, J. E. (PM) 264-440
Johnston, M. D. 301-140L
Lock, R. E. 301-140L

Mars 2001 Odyssey Mission
Arroyo, B. 264-235
Harris, J. A. 301-455
Mase, R. A. 264-380
Nakata, A. Y. 264-235
Spencer, D. A. 264-255

NASA Headquarters
Costrell, J. A. . . . . Code MT
Hertz, P. . . . . Code SR
Holmes, C. P. . . . . Code SR
Spearing, R. E. . . . . Code M-3

NASA/ARC/General
Campo, R. A. . . . . ARC 244-14

NASA/GSFC/General
Barbehenn, G. M. . . . . GSFC m/s 440.8
Levine, A. J. . . . . GSFC m/s 452.0
Martin, J. B. . . . . GSFC m/s 451.0

NASA/SOMO
Dalton, J. T. . . . . GSFC m/s 720.0
Dowen, A. Z. 303-400
Hall, V. F. . . . . JSC Code TG
Morse, G. A. . . . . JSC Code TA
Thompson, E. W. . . . . JSC Code GA

NOZOMI (Planet B)
Chang, A. F. 264-844
Tay, P. 264-235
Yetter, K. E. 264-235

Radio Astronomy
Klein, M. J. (PM) 303-402
Kuiper, T. B. (PS) 169-506
Martinez, G. 507-120
Wolken, P. R. 507-105

Space Infrared Telescope Facility (SIRTF)
Arroyo, B. 264-235
Ebersole, M. M. 264-767
Gallagher, D. B. (PM) 264-767
Kwok, J. H. 264-767

StarLight Mission
Deutsch, M. C. 301-250D
Linfield, R. P. (PS) 301-486
Livesay, L. L. (PM) 301-451
Spradlin, G. L. 303-402

Stardust
Duxbury, T. C. (PM) 264-379
Ryan, R. E. 301-285
Tay, P. 264-235
Yetter, K. E. 264-235

Ulysses / Voyager
Bray, T. L. 264-114
Brymer, B. F. 264-114
Cummings, A. C. . . . . CIT 220-47
Hall, Jr., J. C. 264-801
Massey, E. B. (PM) 264-801
Nash, J. C. 264-114
Smith, E. J. (PS - ULS) 169-506
Webb, I. J. 264-114

U.S. Space VLBI
Altunin, V. I. 303-402
Miller, K. J. 264-828
Smith, J. G. (PM) 264-828

YOHKOH
Chang, A. F. 264-844

Other Organizations
Crimi, G. F. . . . . SAIC
Laemmel, G. . . . . DLR-GSOC
Wanke, H. . . . . DLR-GSOC

Please mark any additions, deletions, or corrections to this distribution list and return to:

David G. Morris
Jet Propulsion Laboratory
4800 Oak Grove Drive, 303-403
Pasadena, CA 91109 / 818-393-3535
email: David.G.Morris@jpl.nasa.gov

GENESIS SEARCH FOR ORIGINS

GENESIS MISSION OVERVIEW

Presentation to JURAP
2nd Edition

E. Hirst
JPL - Mission Design
19 April 2001

http://genesismission.jpl.nasa.gov

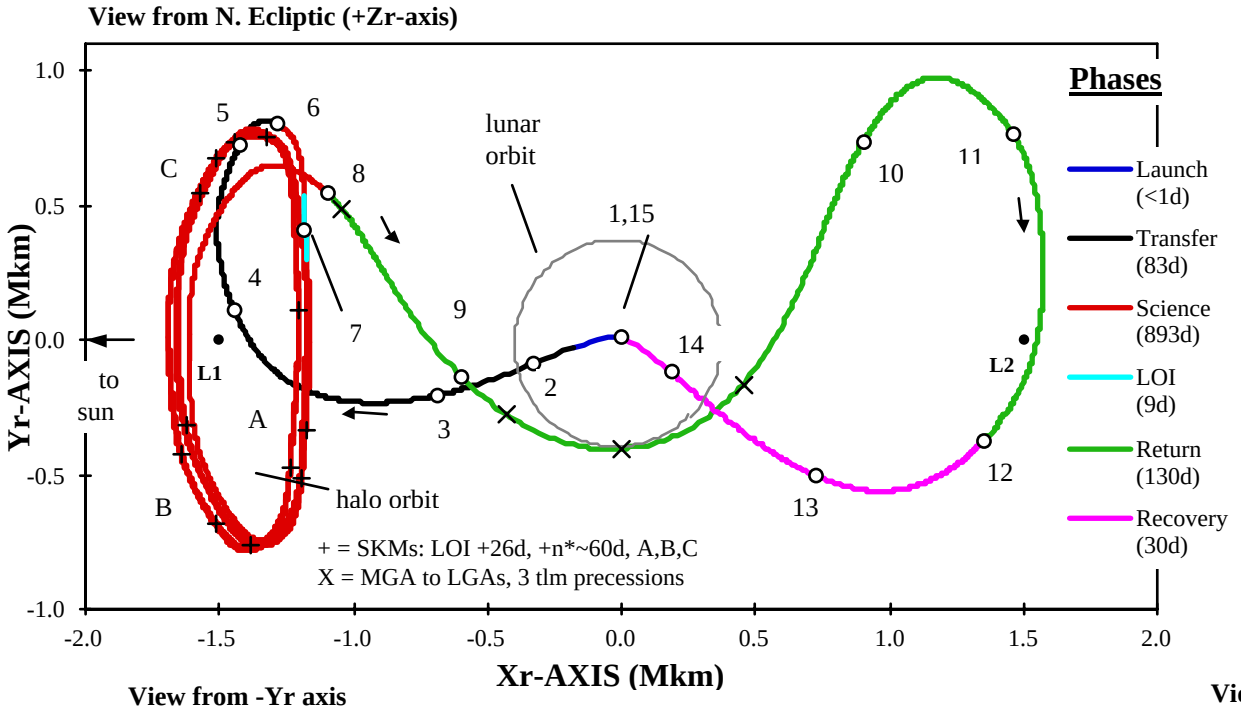
Mission Overview

- **Liftoff: 30 July 2001 16:36:01 UTC (09:36:01 PDT) from Kennedy Space Center**
  - **Delta II 7326 w/ Star 37 third stage**
- **Launch Period: 30 July - 14 August 2001, daily window for collision avoidance: +0-120 sec**
- **Mission Phases: 3.1 year flight plan (37.3 months) - one extra loop at L1 vs. February mission**

Launch:	**30 Jul 01**	**<1 d**	**Separation, Sun Acq, DSN Acq**
Transfer:	**30 Jul 01 - 21 Oct 01**	**83 d**	**2 TCMs, Science checkout, NAV cals**
Science:	**21 Oct 01 - 01 Apr 04**	**893 d**	**LOI, 15 SKMs, Science collection**
Return:	**01 Apr 04 - 09 Aug 04**	**130 d**	**3 TCMs, Science OFF, NAV cals**
Recovery:	**09 Aug 04 - 08 Sep 04**	**30 d**	**3 TCMs (terminal), SRC Release**
Backup:	**08 Sep 04 - 16 Oct 04**	**38 d**	**available if first opportunity fails**

- **Primary Entry: 08 September 2004 15:53:51 UTC (08:53:51 PDT) at Utah Test and Training Range**
  - **Mid-air helicopter recovery of capsule**
- **Science Requirement: 22 months of solar wind sample collection, 27 in current plan**

- **LOI = Lissajous Orbit Insertion, SKM = Station Keeping Maneuver, SRC = Sample Return Capsule**

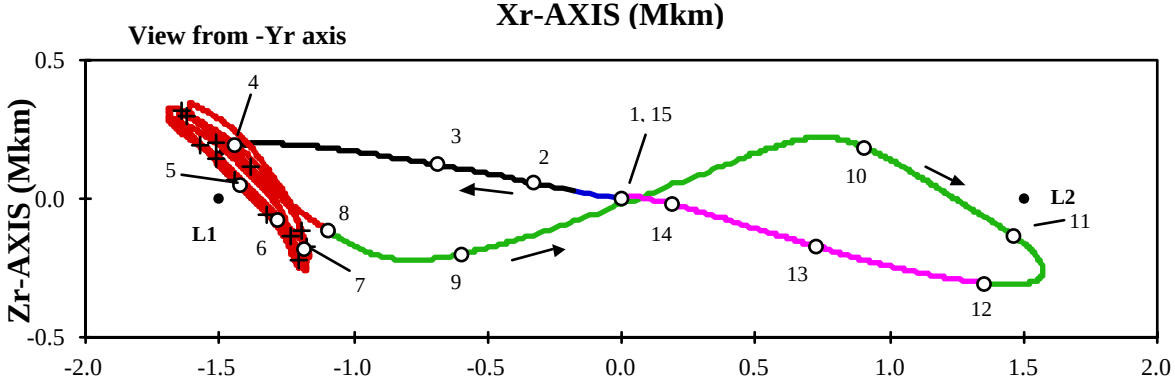


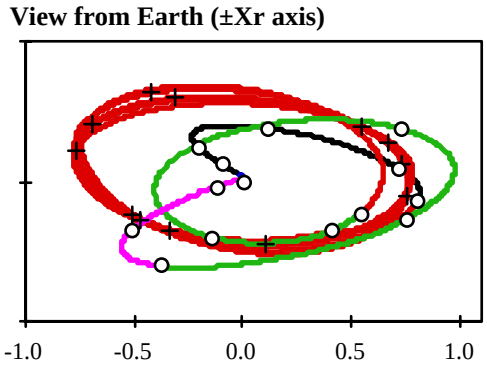
Key Events (date/dFL)

1. Launch 30jul01/000
2. TCM-1 01aug01/002
(3. TCM-2 06aug01/007)
4. TCM-3 03sep01/035
(5. TCM-4 03oct01/065)
6. Start Science 21oct01/083
7. LOI (TCM-5) 16nov01/109
8. End Science 01apr04/976
9. TCM-6 22apr04/997
10. TCM-7 25may04/1030
11. TCM-8 30jun04/1066
12. TCM-9 09aug04/1106
13. TCM-10 29aug04/1126
14. TCM-11 07sep04/1135
15. Entry 08sep04/1136

or

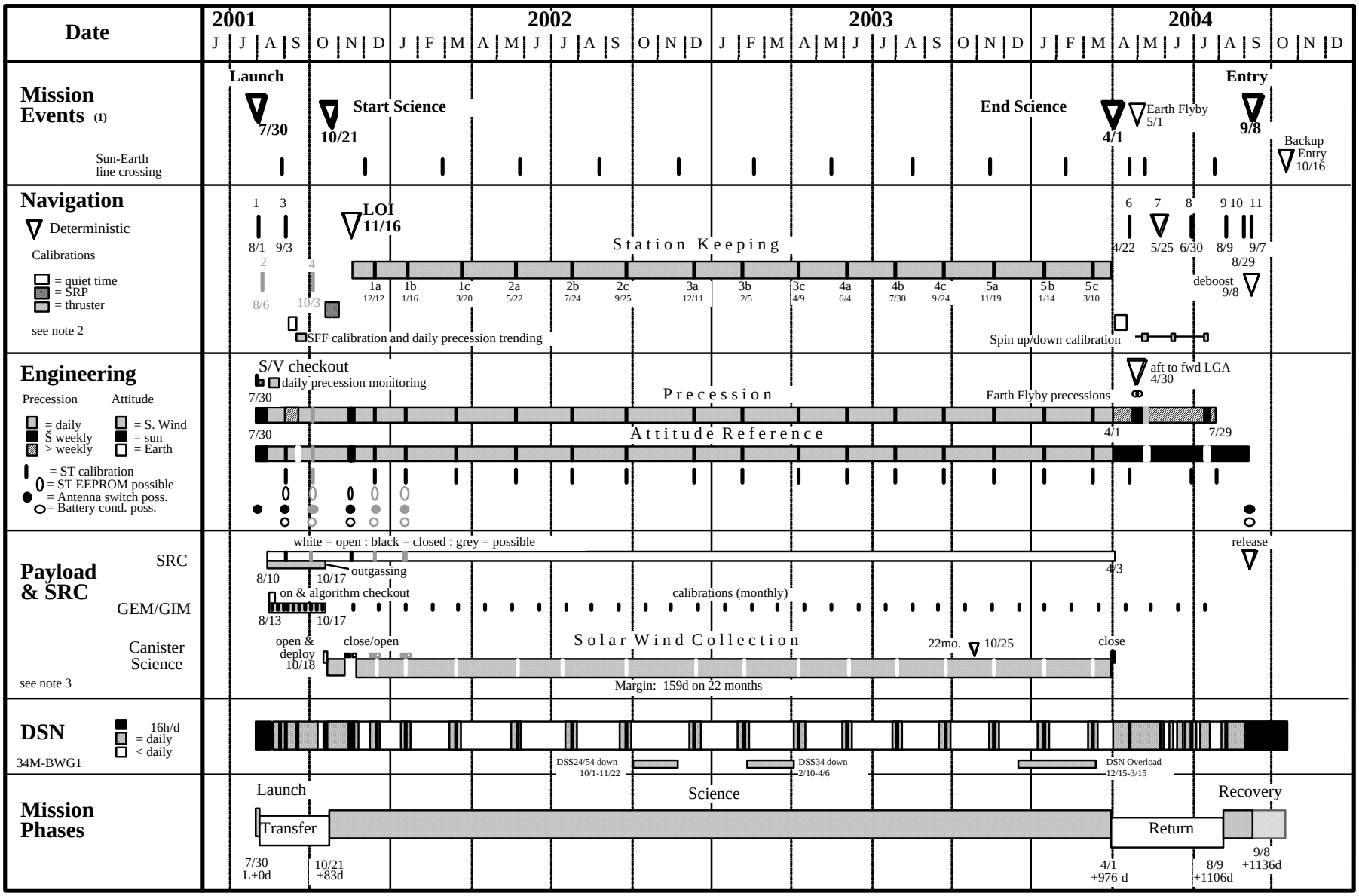
Divert 07sep04/1135
B. Entry 16oct04/1174
[backup orbit TBR]





Axes: **Xr** = Sun-Earth Line, pos anti-sun, **Yr** = (**Zr**) X (**Xr**), **Zr** = N. Ecliptic

GENESIS MISSION OVERVIEW



Notes: 1. Launch Period: 7/30-8/14, backup entry = primary + two 19-day loops
2. SRP calibration: precession maneuvers allowed, Quiet time: no precession maneuvers.
3. SRC = Sample Return Capsule, GEM = GENESIS Electron Monitor, GIM = GENESIS Ion Monitor

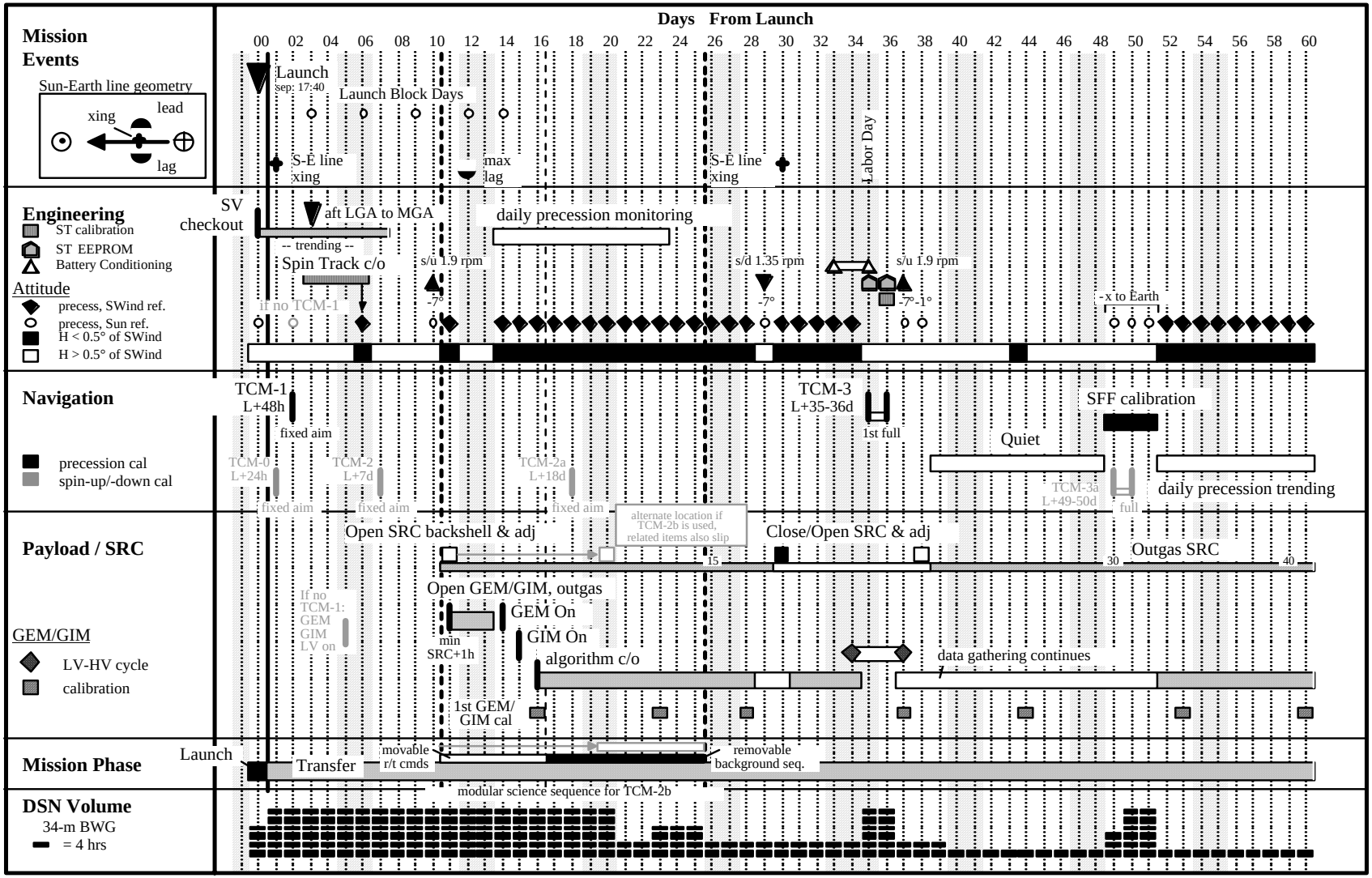
Launch to LOI

- **Key Early Mission Activities:**
  - **L+1.5h: D/L transmitter on, initial acquisition at Goldstone (was Canberra)**
  - **L+48h: TCM-1 (contingency as early as L+24 h, and n*24h), SSS based, fixed aimpoints**
  - **L+72h: Spin Track (Star Tracker + DSS) attitude control turn on and checkout**
  - **L+7d: TCM-2 (contingency)**
  - **L+11d: Open Sample Return Capsule, and science covers (backup window at L+20d)**
  - **L+14d: Start science turn on and checkout, daily precessing (backup window at L+23d)**
  - **L+35-36d: TCM-3, spin track based, possible two-part (expect to close SRC)**
  - **L+39-51d: NAV calibrations (orbit determination, small forces)**
  - **L+65-66d: TCM-4 (contingency)**
  - **L+83d: Open Science Canister, deploy/unshade collection surfaces, initiate autonomy**
  - **L+109d: LOI (close/open canister science, pause/resume science autonomy)**

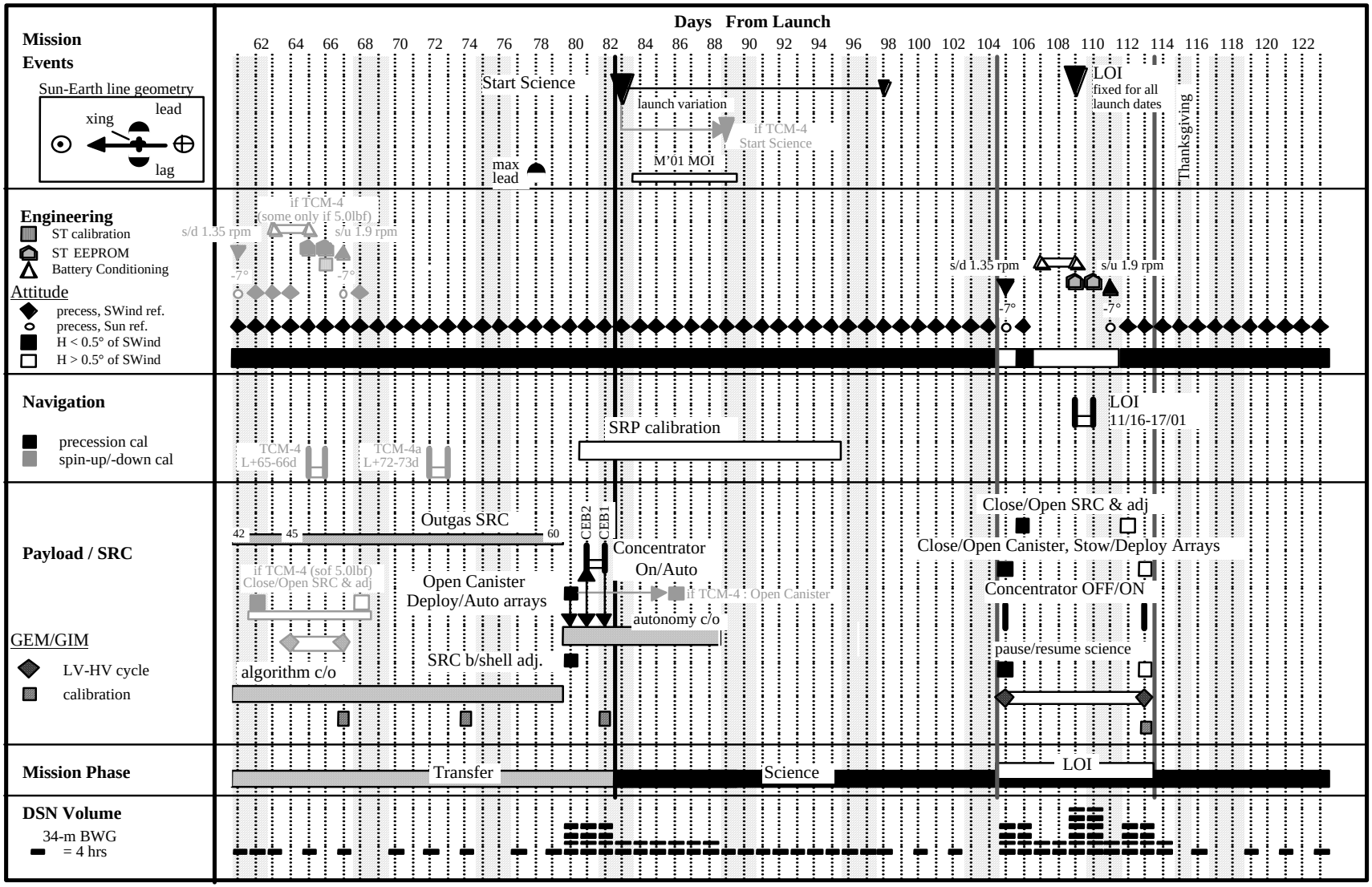
- **Why do we have to perform maneuvers so early?**
  - **Direct transfer to L1 on low-energy, non-escaping trajectory incurs greater penalty for correcting launch energy errors the farther up in the "gravity well" the correction is applied. E.g. dV correction at 24 hrs has grown by a factor of 6 over the original launch error.**

DSS = Digital Sun Sensor, LOI = Lissajous Orbit Insertion, SSS = Spinning Sun Sensor

GENESIS MISSION - AUG LAUNCH TIMELINE (L+0-60d)



GENESIS MISSION - AUG LAUNCH TIMELINE (L+61-123d)



DSN Req: Launch/Transfer

- **DSN net: 34m BWG1 - has required S-band up/down (only 34m net with S-band uplink).**
- **Initial Acquisition: DSS-24, DSS-15, DSS-16 and**
- **First Day: 34 BWG1 net, 26m net**
  - **Critical Maneuver at L+48 hrs! First time ever for JPL-LMA operated missions.**
  - **SDU, DS-1 experience is that 2nd 34m acquired before DSS-34**
  - **First Goldstone initial acquisition in some time.**
- **L to L+20d: Continuous**
  - **TCM-1 (SSS only), TCM-2**
  - **Spin Track ACS (Star Tracker + DSS) checkout, very complicated set of H/W and FSW algorithms.**
  - **SRC Open and Science turn on and algorithm checkout**
- **L+20d to 34d: 8-16 hrs/day**
  - **Science checkouts, station overlaps for minimal telemetry data outage, seamless uplink transfers,**
  - **Need to be ready to collect samples @ L+83d**

DSS = Digital Sun Sensor, SRC = Sample Return Capsule, SSS = Spinning Sun Sensor

DSN Req: Transfer/Science

- **L+35d to 62d: 4-24 hrs/day**
  - **TCM 3 (24 hrs/d x2d): potential for being two-part, and off-sun**
  - **Navigation calibrations (4 hrs/d): orbit determination, daily precession trending**
  - **SFF calibrations (24 hrs/d x2.5d): series of Earth-pointed precessions for direct calibration**
  - **Continue science checkout (station overlaps for minimal telemetry data outage, seamless uplink transfers).**
- **L+62d to 79d: 12 hr/wk (three 4 hr passes)**
  - **A glimpse into the future - more typical DSN tracking requirement for science phase**
- **L+80d to 97d: 4-16 hr/d**
  - **Open Science canister, turn on concentrator, deploy arrays, START SCIENCE**
  - **NAV calibration with science canister open**
- **L+98d to L+104d: 12 hr/wk (three 4 hr passes)**
  - **More typical science phase**
- **L+105d to L+114: 8-24 hrs/day**
  - **Typical DSN requirement in support of a TCM/SKM. This one is for LOI. 48 hrs continuous for 2-part probability.**

LOI = Lissajous Orbit Insertion, SFF = Small Forces File, SKM = Station Keeping Maneuver

DSN Req: Science/Return/Recovery

- **Typically**
  - **Three 4 hr 34m BWG1 tracks**
- **TCMs/SKMs**
  - **8-24 hrs/day during week of TCM/SKM, 48 hrs continuous for two-part probability.**
- **Early Return Phase**
  - **12-16 hrs/day to close turn off SRC science, close science canister, close SRC**
  - **4 hrs/day for NAV calibrations (orbit determination, spinup/down, precessions)**
  - **4 hrs/day for distant Earth flyby**
- **Recovery Phase**
  - **4-8 hrs/day for E-30d to -11d**
  - **16-24 hrs/day for E-10d to E**

SKM = Station Keeping Maneuver, SRC = Sample Return Capsule

Concerns

- **34m BWG1 planned down time for NSP upgrade**
  - **10/01 - 11/22/02 : DSS24/54 down**
    - **Have SKMs just prior and after down time, 77 day separation, longer than typical**
    - **DSS34 is only uplink/downlink path.**
  - **02/10 - 04/06/03 : DSS34 down**
    - **Similar SKM strategy, but 63 days apart because only one DSS down, may increase to 70.**

- **Fall 2003 / 2004 overloaded DSN**
  - **GNS minor player in DSN conflict, but could be affected by off-loading of other nets.**
  - **Still in science phase (ends 4/1/01), but 3 SKMs between 11/03 - 4/04. Scheduling flexibility, can move with sufficient notice, but can't delete.**
  - **See 26-m notes next page.**

- **Max. elevation keyhole encountered at DSS-34 during Return and Recovery. Decreased slightly for August mission 86.7 deg (vs. 89.4 deg). 810-5 indicates keyhole at approximately >85 deg. Is more detailed assessment available? Preliminary assessment of February mission (Kehrbaum) indicates antenna slew capability is sufficient to break track and reacquire. Prefer no break in track. Another alternative: schedule around keyhole problem.**

26-m Net Considerations

- **Planning 26m downlink and navigation data as backup during critical activity (Launch, Return) and TCM/SKM. [Note: Pre-launch testing of 70m downlink path for use in contingency also planned].**

- **26-m automation task does not resolve Project concerns about MMO commonality and multiple interfaces with DSN, which is the driving factor for Project decision to use 34-m only (34-m downlink capability needed for data return).**
- **Unattended operation/commanding and staffing only for critical or emergency operations not compatible with Project requirements.**
- **26-m automation tasks to give NSP look and feel, but automated commanding interface not common with MMO/34-m operations. Store-and-forward retained, but only for staffed ops.**
- **26-m NSOE - OSOE generation not a standard MMO process. Build interface needs to be investigated.**

- **Project recognizes possible use of 26-m on a more regular basis during 2003/2004 DSN overload. Regular use of 26-m as downlink/navigation backup keeps Project up to date with 26-m operations and investigate strategies for 2003/2004 period, including possible consideration of 26-m as uplink option.**

Additional Information

Science Overview

- **Sun contains most of the mass of the solar system and so its composition defines the average solar system composition.**

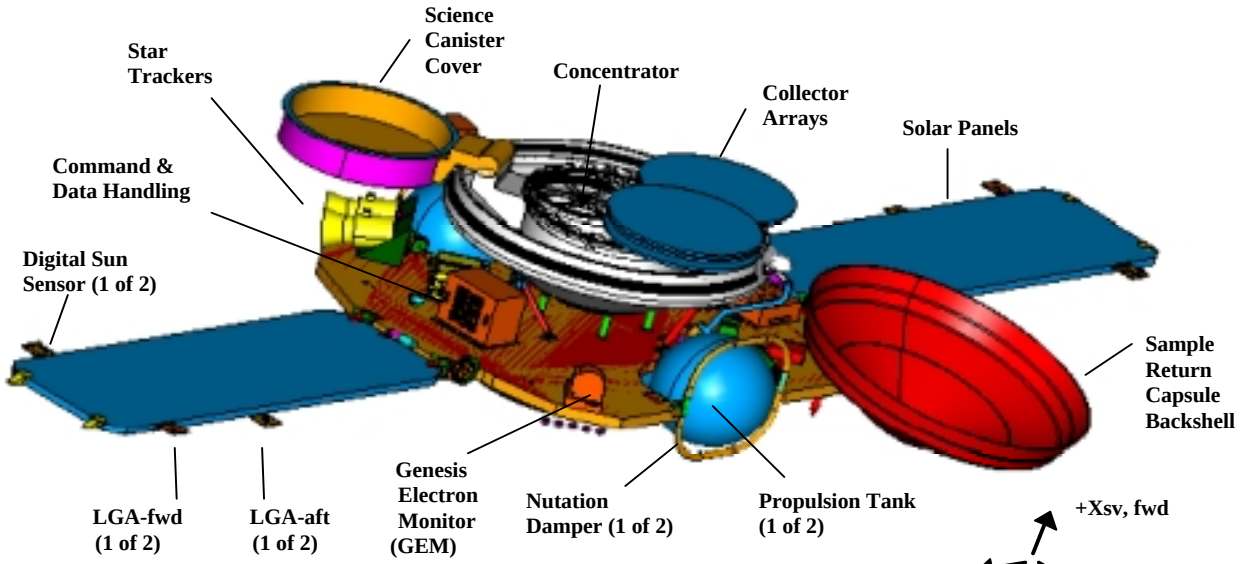
- **Differences between solar matter and other parts of solar system (planets, comets, meteorites, etc.) reveal conditions that prevailed at the formation of the solar system, and the processes that occurred in its evolution. BIG questions:**
- **How can we explain the great diversity of planetary objects?**
  - **What makes Earth different from its planetary neighbors?**
  - **What is the Sun made of? Are we made of the same stuff?**

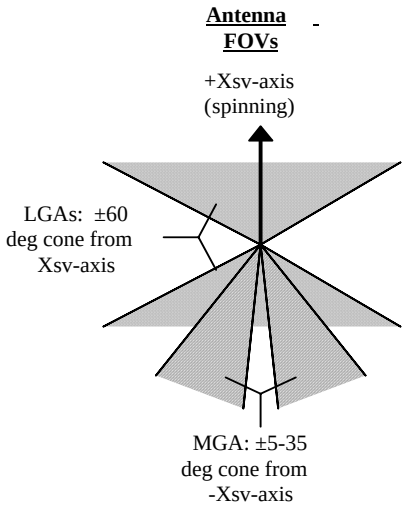
- **Existing solar matter studies not direct, based mainly on meteorites and Apollo "foil" experiments.**

- **Genesis will provide solar wind samples for analysis in terrestrial laboratories (more accurate than in-situ missions).**

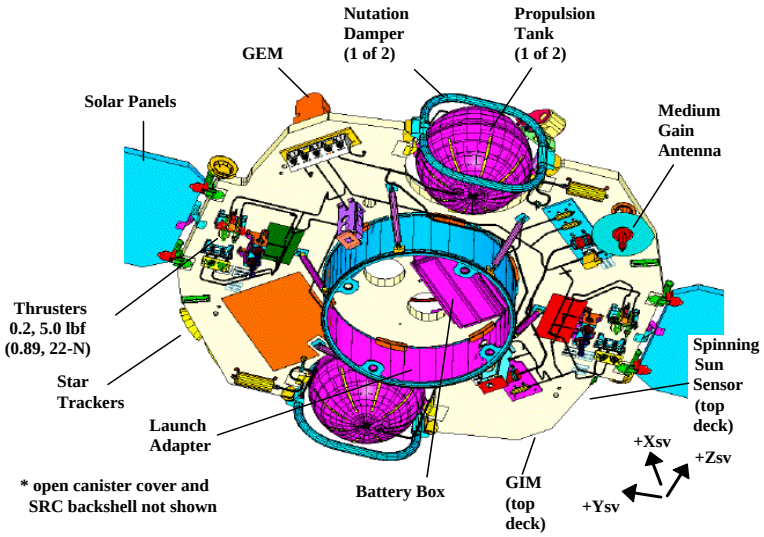
Spacecraft Overview

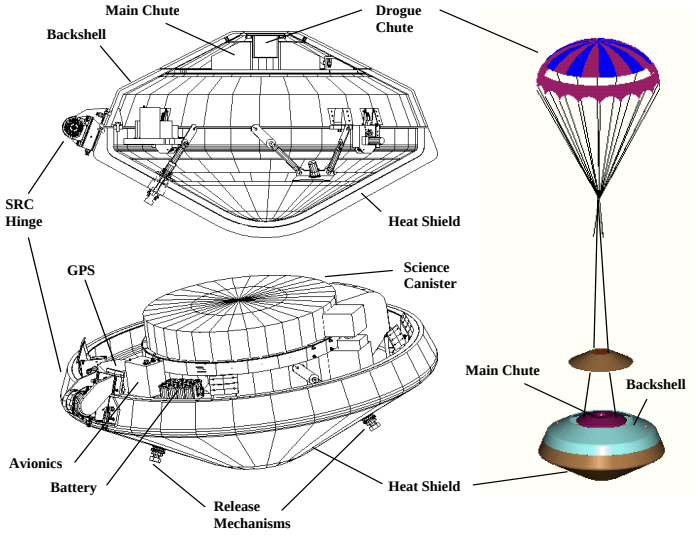
- **ACS: +x-axis spinner (1.6, 3.0, 10, 15 rpm), celestial sensors (no IMU, no gyros, no accels).**
  - **Spin Track @ 1.6 rpm (Star Tracker + DSS) and off-sun angle < 30 deg [3-D attitude knowledge]**
  - **Spinning Sun Sensor @ > 2.0 rpm and/or off-sun angle >30 deg, with sunward and antisun keep out zones [off-sun angle attitude knowledge only]**
- **PROP: blowdown hydrazine, 0.2 lbf / 5.0 lbf uncoupled thrusters**
  - **Two tanks w/ 142 kg total propellant for ~540 m/s (but only 480 m/s allocated)**
- **C&DH: 20 MHz, 128 MB (FSW, SEQ, TLM storage), Fault Protection/Safe Mode**
- **TELECOM: S-band, aft MGA (47.4Kbps during science), two aft LGAs, two fwd LGAs**
- **POWER: 2 fixed solar panels (265 W @ EOL), one NiH2 rechargable battery (448 Wh @ 100% SOC)**
- **THERMAL: FSW/thermostat controlled heaters, and passive radiators, blankets, paint, tape, etc.**
- **SCIENCE: Ion/Electron monitors on deck, Collection concentrator (20:1 ratio) and arrays in SRC, autonomous control of concentrator voltage and array unshading.**
- **SRC: Backshell and heatshield contain collection payload, parachute and recovery avionics**
- **636 kg wet mass, 6.8 m tip-to-tip of solar arrays, 2.0 m wide s/c bus**



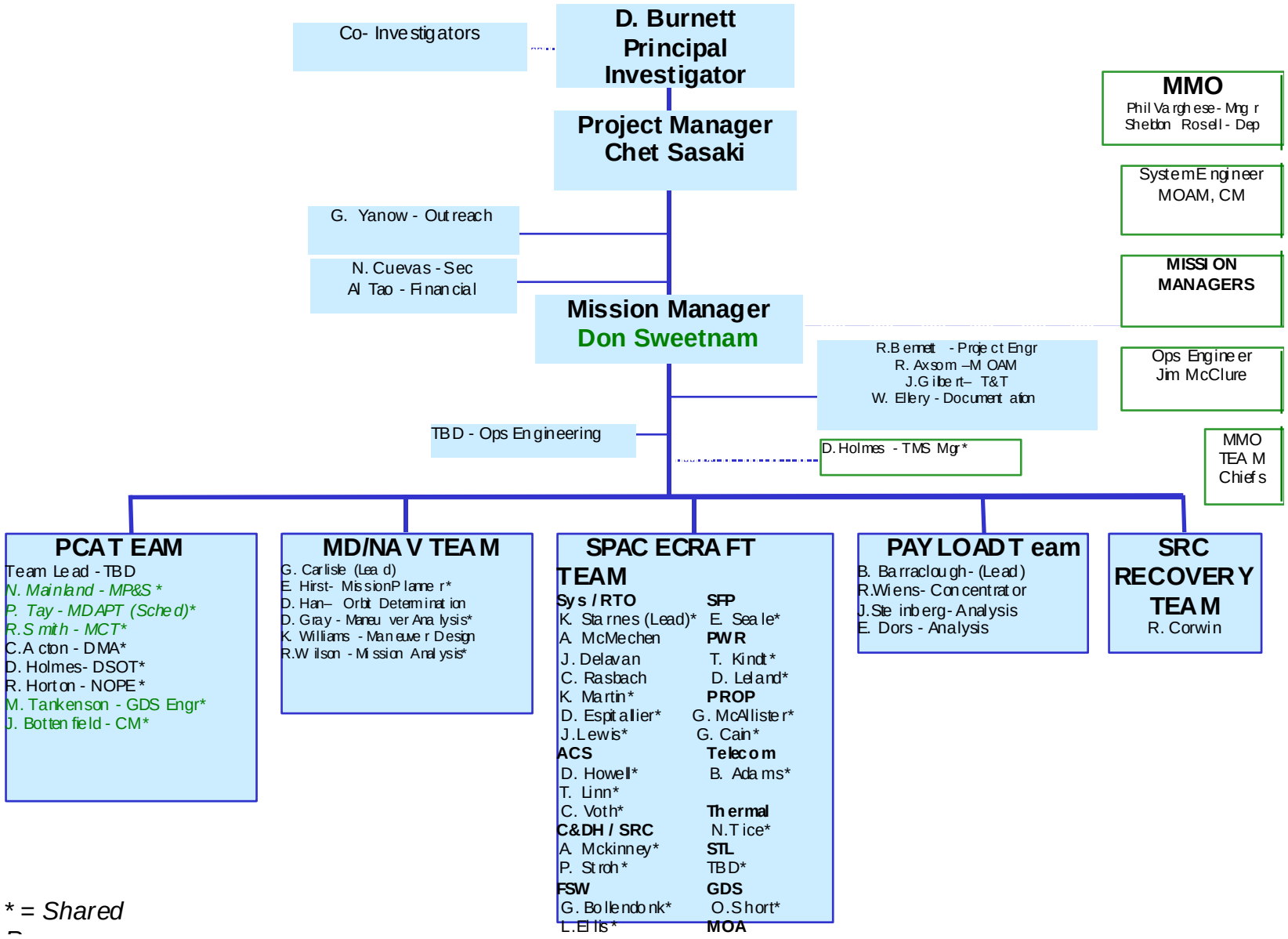


* Genesis Ion Monitor (GIM) is caddy corner GEM, on +Xsv deck (fwd)
* MGA and thrusters on -Xsv deck, towards -Xsv-axis (aft)



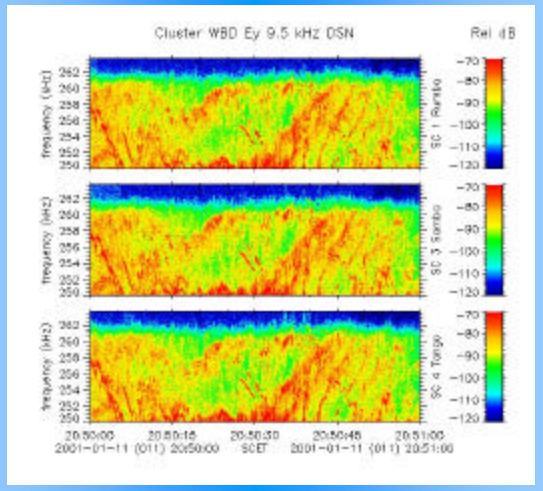


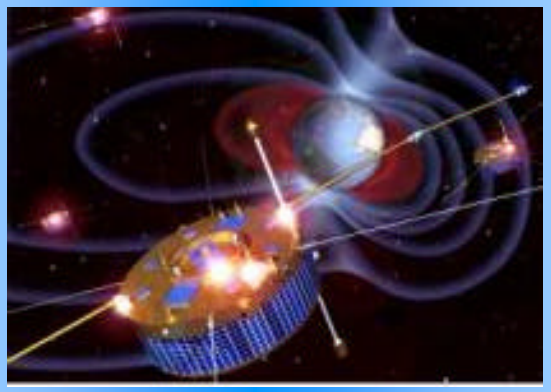
Helicopter Mid-Air Recovery


Co- Investigators
D. Burnett
Principal Investigator
Project Manager
Chet Sasaki
MMO
Phil Varghese - Mng r
Shelton Rosell - Dep
System Engineer
MOAM, CM
G. Yanow - Outreach
N. Cuevas - Sec
Al Tao - Financial
MISSION MANAGERS
Mission Manager
Don Sweetnam
R.Bernett - Project Engr
R. Axsom –M OAM
J.Gilbert– T&T
W. Ellery - Document ation
Ops Engineer
Jim McClure
TBD - Ops Engineering
D. Holmes - TMS Mgr*
MMO TEAM Chiefs
PCAT EAM
Team Lead - TBD
N. Mainland - MP&S *
P. Tay - MDAPT (Sched)*
R.Smith - MCT*
C.Acton - DMA*
D. Holmes- DSOT*
R. Horton - NOPE*
M. Tankenson - GDS Engr*
J. Bottenfield - CM*
MD/NAV TEAM
G. Carlisle (Lead)
E. Hirst- MissionPlanner*
D. Han– Orbit Determination
D. Gray - Maneuver Analysis*
K. Williams - Maneuver Design
R.Wilson - Mission Analysis*
SPACECRAFT TEAM
Sys / RTO
K. Starnes (Lead)*
A. McMechen
J. Delavan
C. Rasbach
K. Martin*
D. Espitallier*
J.Lewis*
ACS
D. Howell*
T. Linn*
C. Voth*
C&DH / SRC
A. Mckinney*
P. Stroh*
FSW
G. Bollendonk*
L.Ellis*
SFP
E. Seale*
PWR
T. Kindt*
D. Leland*
PROP
G. McAllister*
G. Cain*
Telecom
B. Adams*
Thermal
N.Tice*
STL
TBD*
GDS
O.Short*
MOA
PAYLOAD Team
B. Barraclough - (Lead)
R.Wiens- Concentrator
J.Steinberg- Analysis
E. Dors - Analysis
SRC RECOVERY TEAM
R. Corwin

* = *Shared*

Cluster WBD Experiment





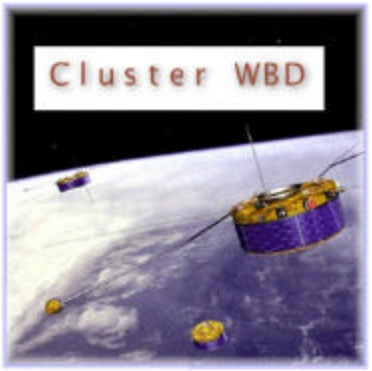
Joint Users Resource Allocation Planning Committee

19 April 2001

Robert L. Mutel

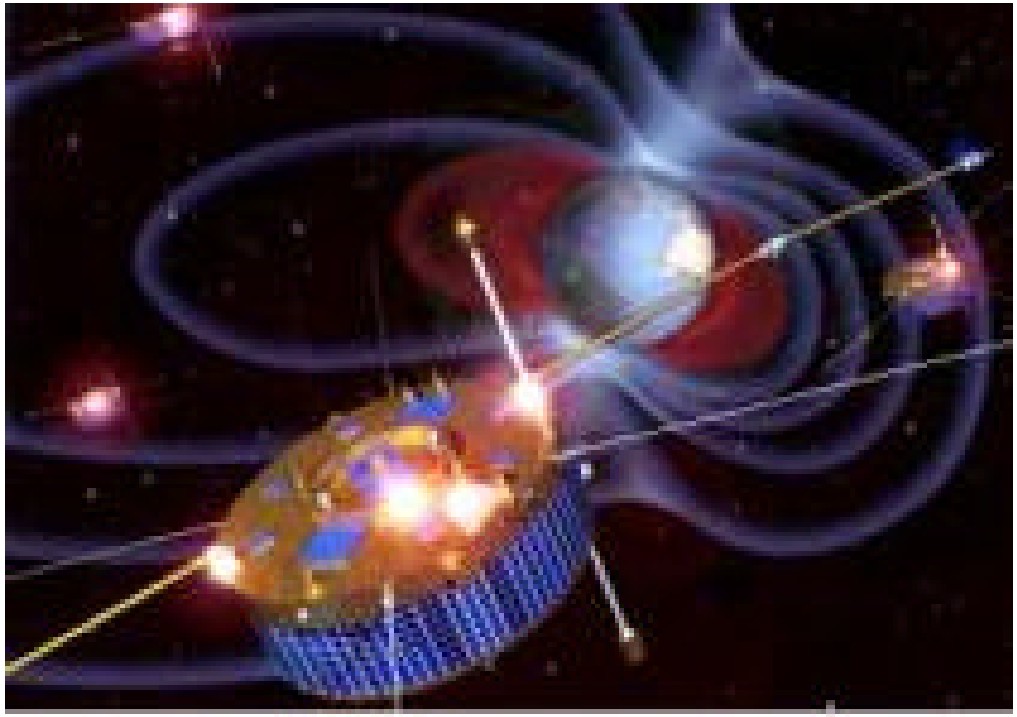
University of Iowa

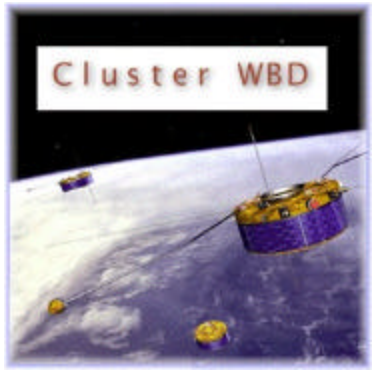
http://www-pw.physics.uiowa.edu/plasma-wave/istp/cluster/home.html



Cluster Mission Goals and History

- The original Cluster mission and Solar Heliospheric Observatory (SOHO) together comprised the Solar Terrestrial Science Programme (STSP), the first 'Cornerstone' of ESA's Horizons 2000 Programme.
- These two missions were selected to investigate the relation between the Sun and the Earth‘s environment.

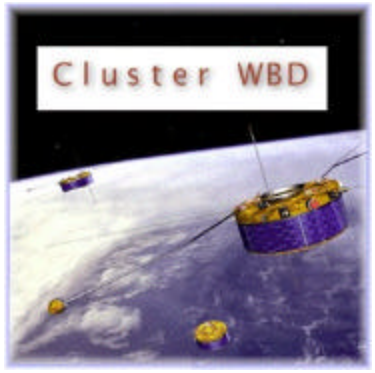




Cluster I Disaster

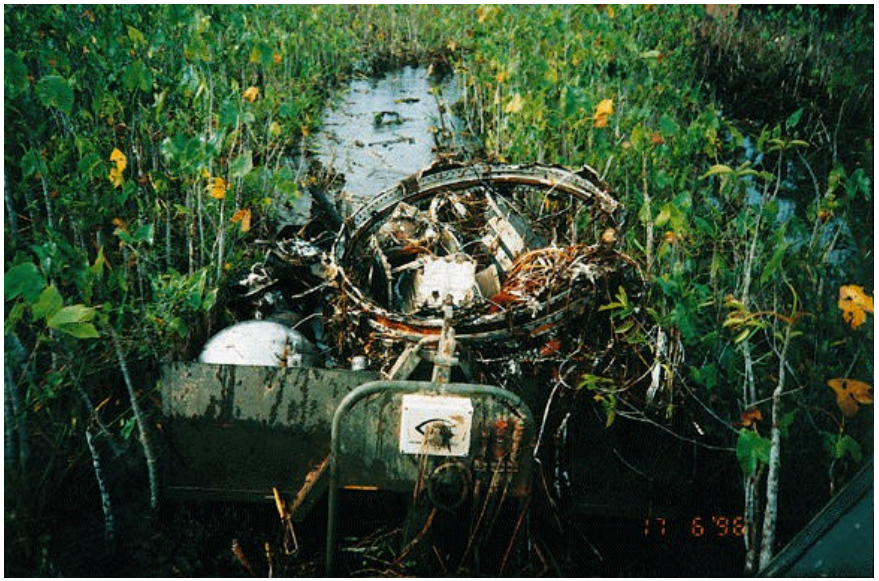
Cluster I launch in June 1996 from French Guyana (Ariane 5 launch).

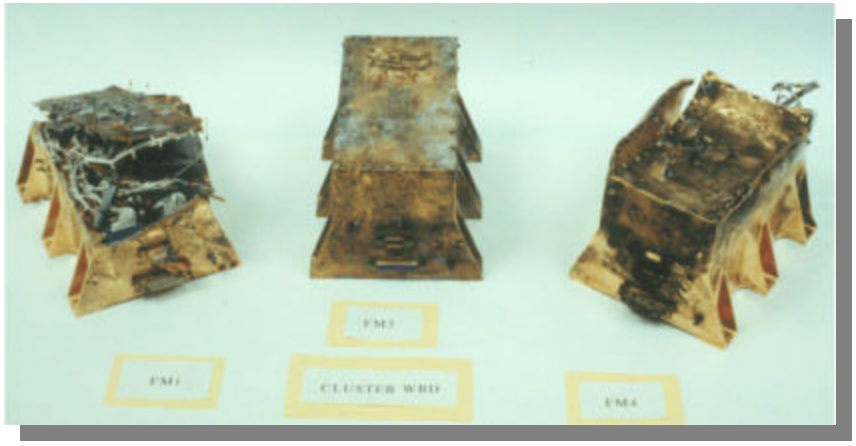
A software error 40 sec after liftoff caused a sudden change in booster direction, resulting in automatic self-destruct.



Cluster I Disaster Continued

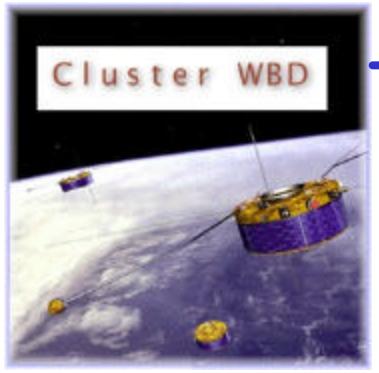
WBD Instrument before (left) and after (bottom) launch. Cluster I in swamp (right).



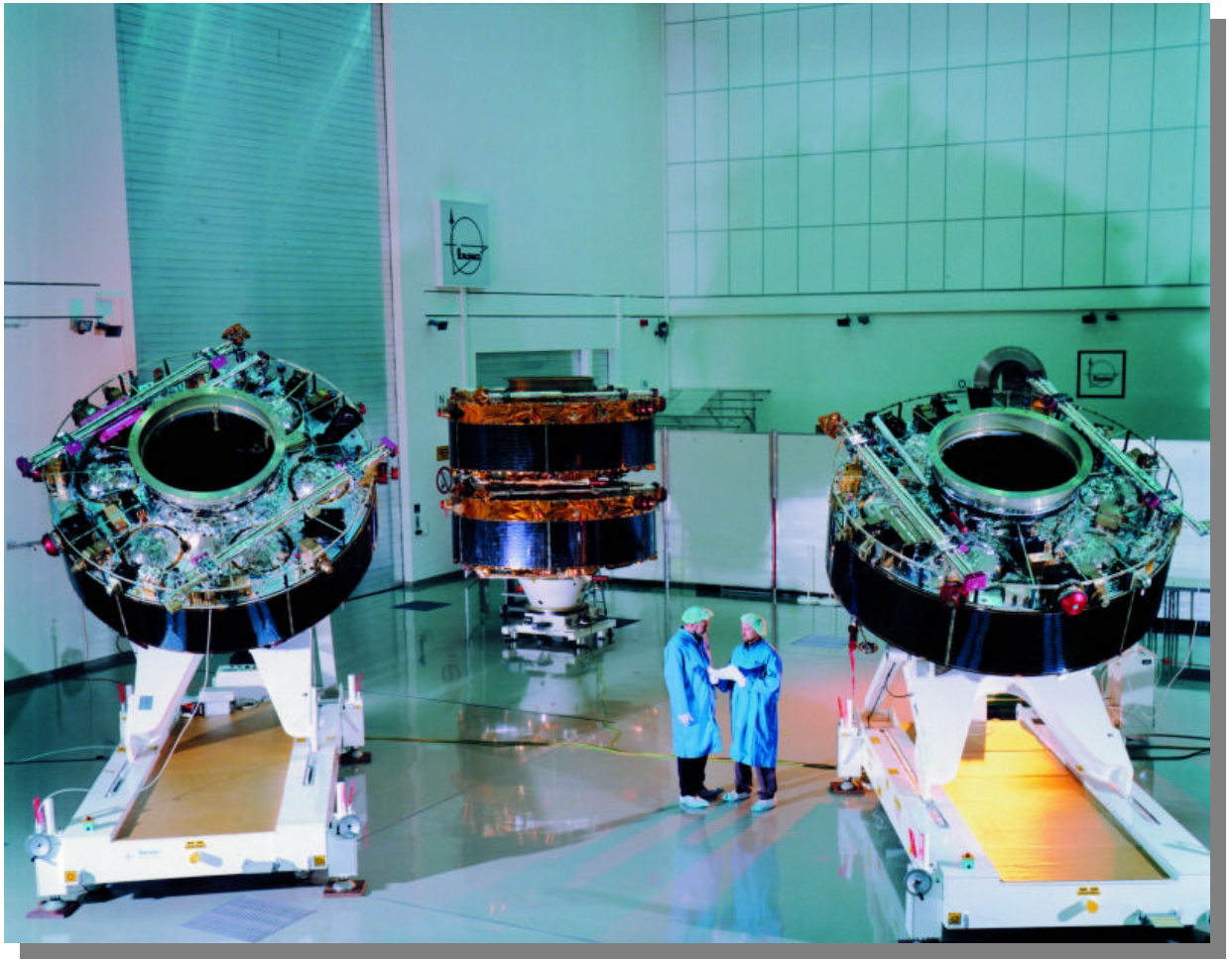


esa SCIENCE

NASA

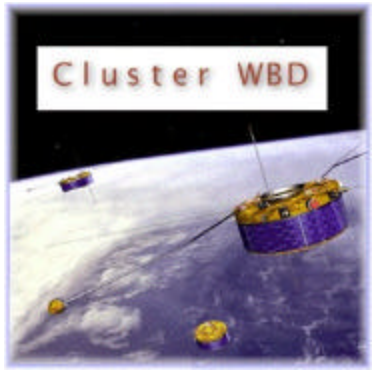


Cluster II Spacecraft During Final Tests



esa SCIENCE

NASA

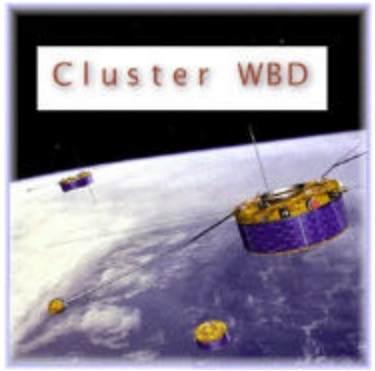


Cluster II Mission: July 2000 Launch

Cluster II launched on two Soyuz rockets in Summer 2000.

esa SCIENCE

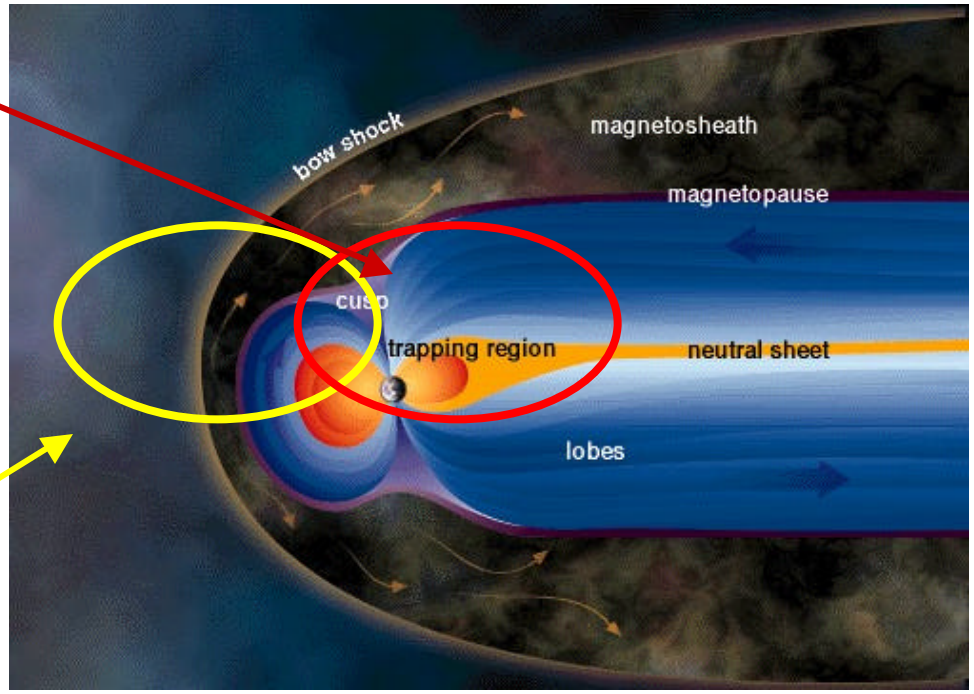
NASA

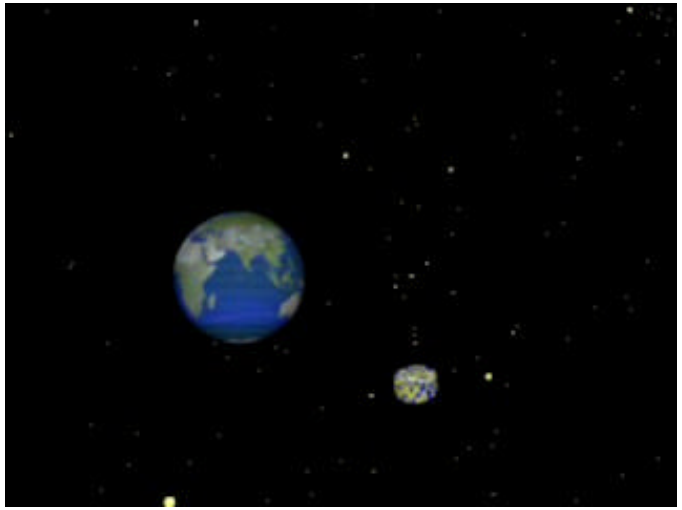


Cluster II Soyuz Launch July 2000

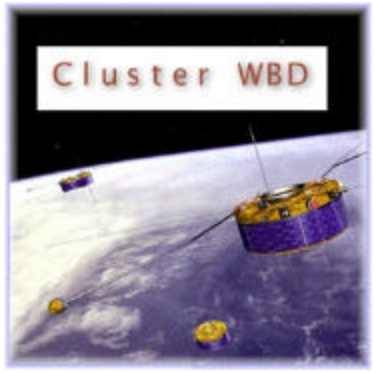
Cluster II Orbits

Cluster orbit (19.6R_E apogee, highly elliptical. is designed to sample inside and outside Earth's magnetosphere (below)





Orbit transfer maneuver: After launch, rockets on spacecraft boosted from geostationary orbit (clip above)



Cluster II Instruments (11 total)

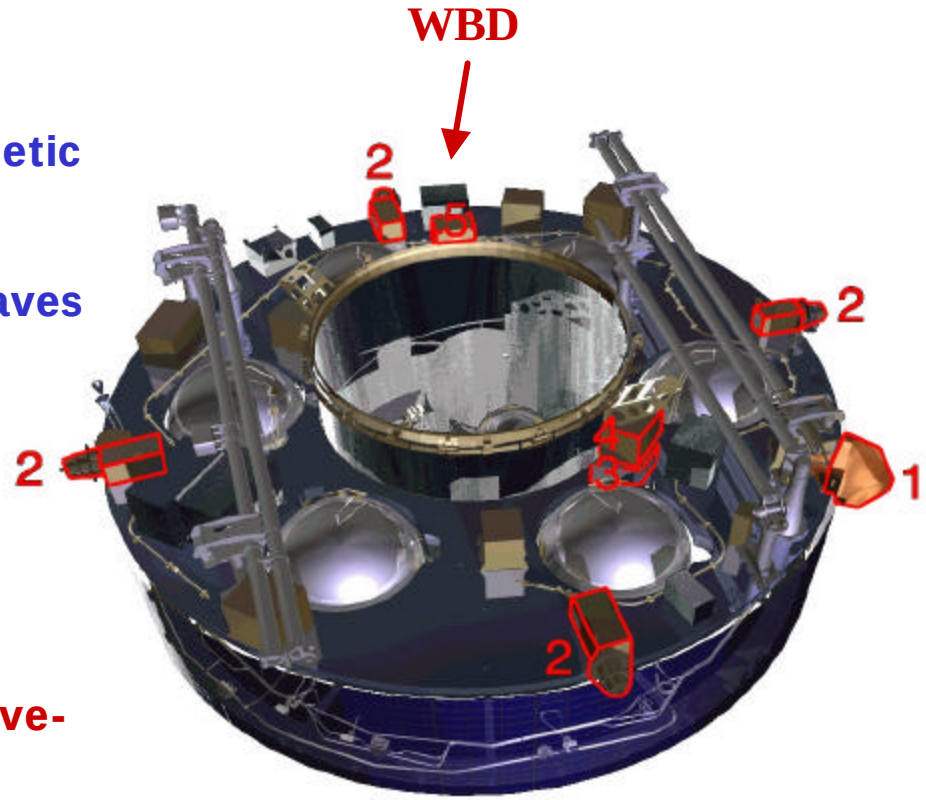
1 STAFF (N. Cornilleau-Wehrlin, F) Magnetic and electric fluctuations (-4kHz)

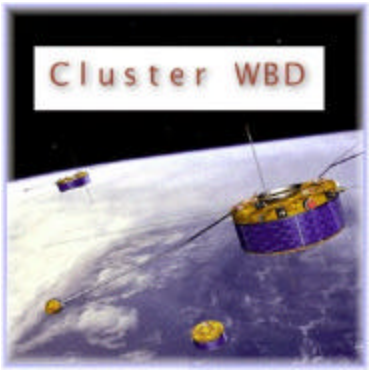
2 EFW (M. Andre, S) Electric fields and waves (DC- 8kHz)

3 DWP (H. Alleyne, UK) Wave processor

4 WHISPER (P. Decreau, F) Electron density and plasma waves (4-80kHz)

5 WBD (D. Gurnett, USA) Electric field wave-forms (25 Hz-577 KHz)



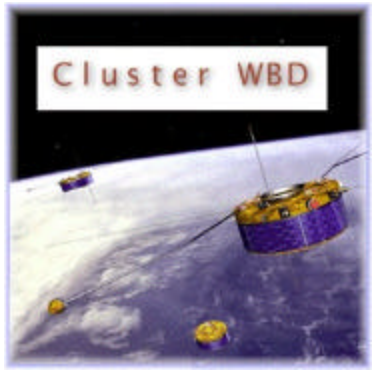


University of Iowa Wideband Data Plasma Wave Instrument (WBD)

- The Wideband (WBD) Plasma Wave Investigation provides high time resolution multi-spacecraft measurements of electric and magnetic field waveforms utilizing a high rate downlink of 220 kb/s to the NASA Deep Space Network (DSN).
- Identical WBD instruments are mounted on all four spacecraft.
- The high frequency/time resolution capability of WBD is the primary characteristic that makes WBD unique from the other Cluster wave experiments, which operate at much lower data rates.
- The high resolution capability allows WBD to obtain multi-spacecraft Very Long Baseline Interferometry (VLBI) measurements of magnetospheric plasma waves and radio emissions.

esa SCIENCE

NASA

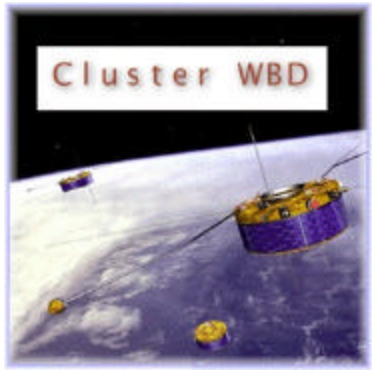


WBD Technical Description

Sensors	Two electric field components (Ey,Ez)
	Two magnetic components (Bx,By)
Conversion Frequencies	0 kHz, 125 kHz, 250 kHz, 500 kHz
Band Pass Filter Ranges	1 kHz to 77 kHz
	50 Hz to 19 kHz
	25 Hz to 9.5 kHz
Frequency Resolution	Determined by FFT
Time Resolution	5-35 sec (depending on mode)
	10-20 ms (per FFT spectrum)
Gain Select dB,	5 dB steps, 16 levels, dynamic range 75
	automatic ranging or set by command
A/D Converter	8-bit, 4-bit or 1-bit at various sample rates
Mass (flight models, measured)	Approx. 1.8 kg
Power (flight models, measured)	Approx. 1.60 W

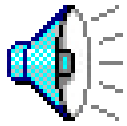
esa SCIENCE

NASA

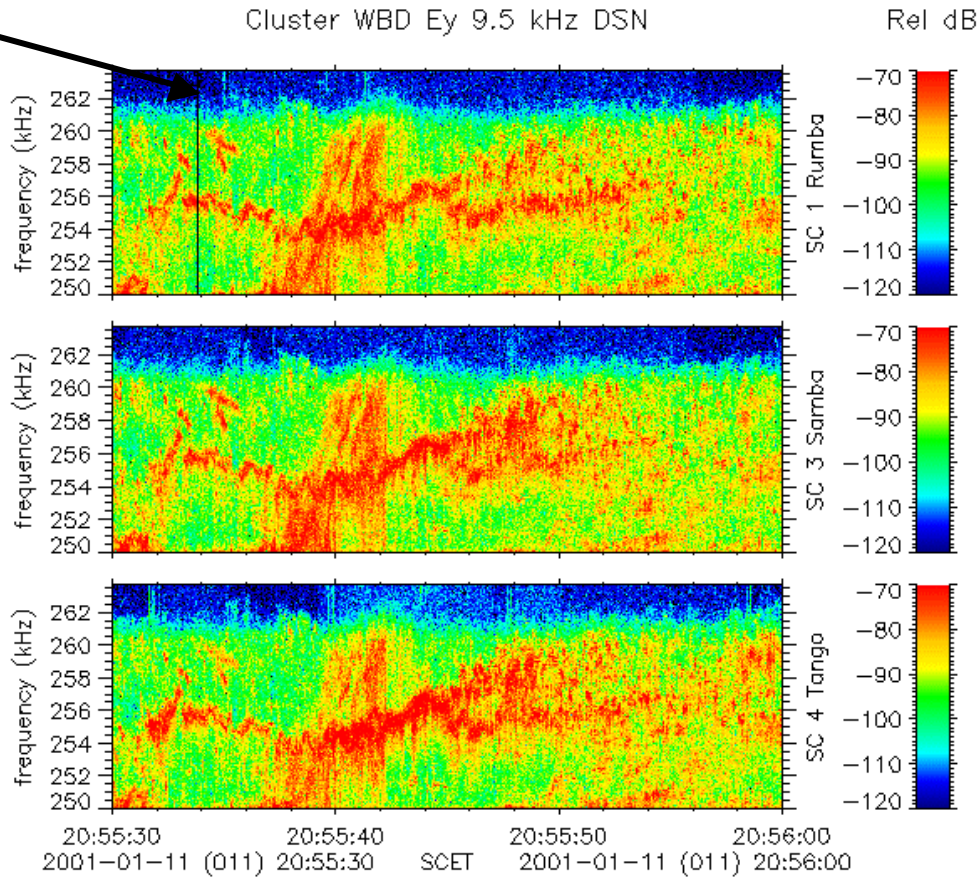


Example of WBD Dynamic Spectra

Auroral Kilometric Radiation (AKR) Bursts



AKR Sounds



Spacecraft

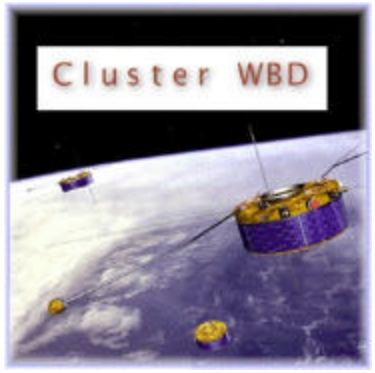
1

3

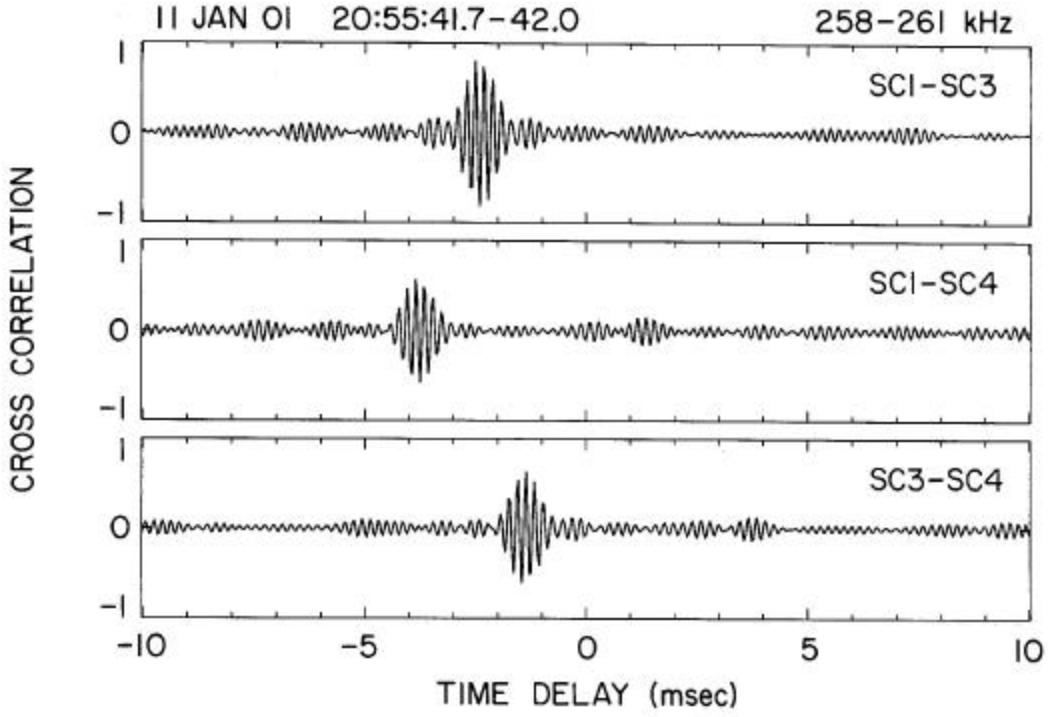
4

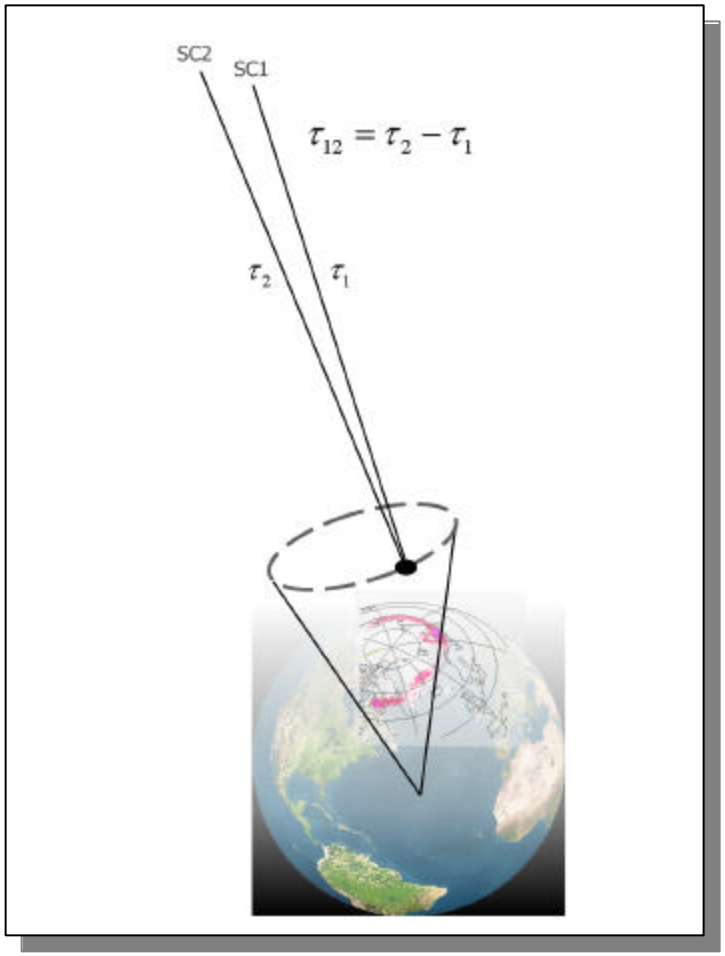
esa SCIENCE

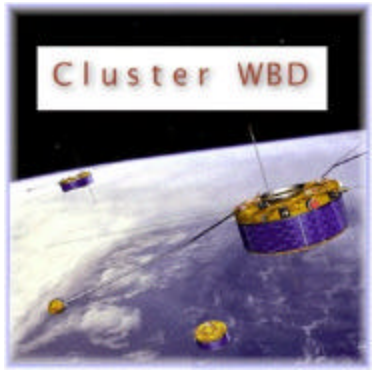
NASA



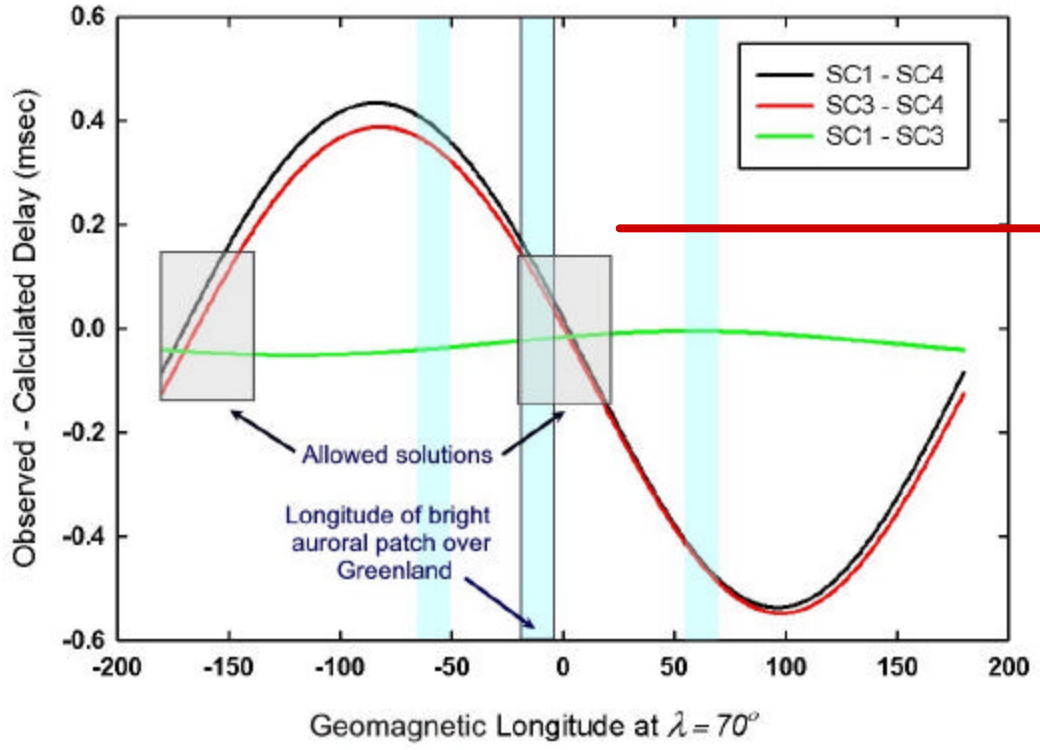
VLBI Using WBD: Cross Correlation Delays Used to triangulate source position

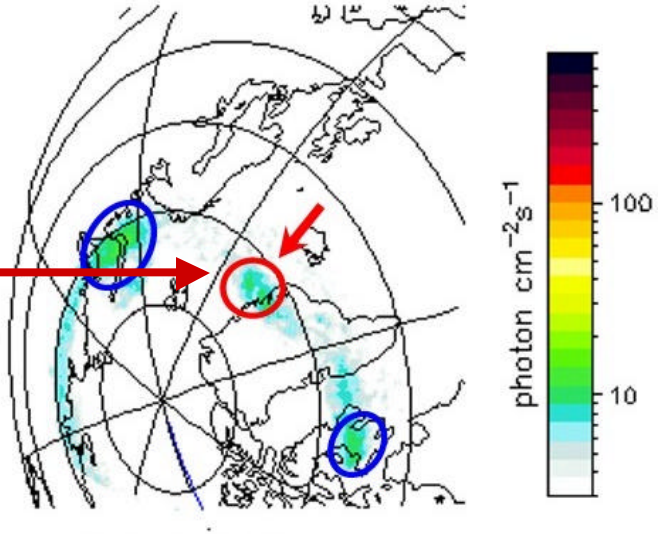


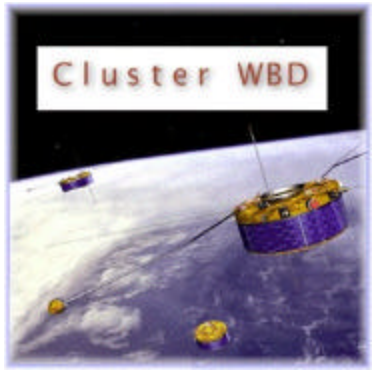




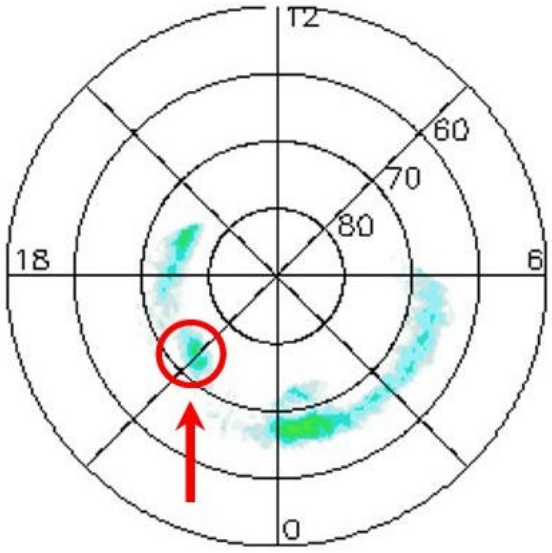
Delay triangulation: AKR Burst associated with Aurora over Greenland



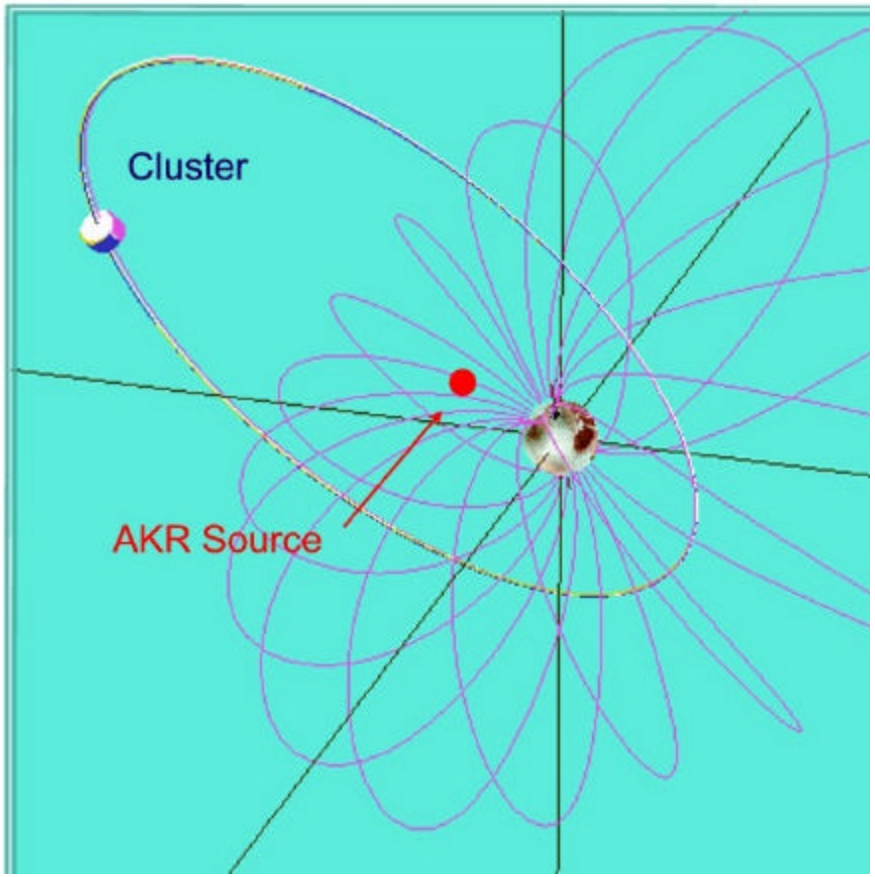


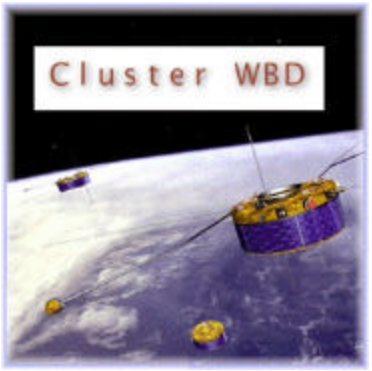


Delay triangulation: AKR Burst Location



Auroral Image Courtesy
G. Parks (POLAR)





Delay triangulation method requires real-time downlink from at least 3 spacecraft

Source location: 3 unknowns (x,y,z), requires at least 3 delays

$$t_{ab} = \frac{1}{c} \cdot \left(\left| \vec{s}_b - \vec{r} \right| + \left| \vec{t}_b - \vec{s}_b \right| - \left| \vec{s}_a - \vec{r} \right| - \left| \vec{t}_a - \vec{s}_a \right| \right)$$

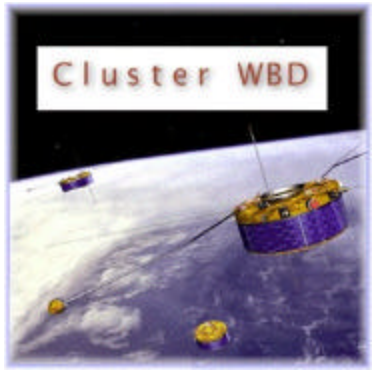
Number of baselines:

$$N_B = \frac{n \cdot (n-1)}{2}$$

n	N_B
2	1
3	3
4	6

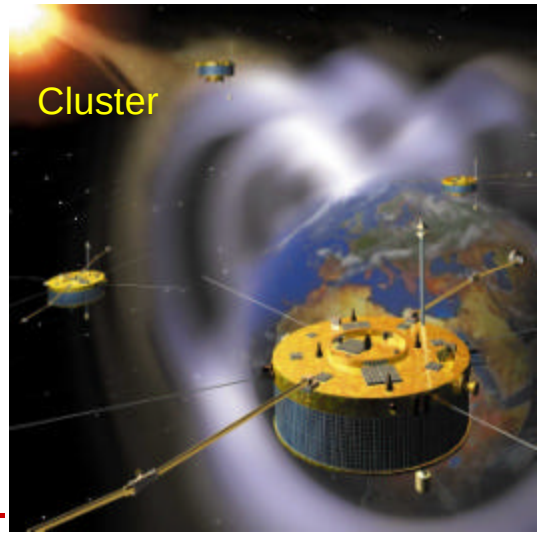
Optimal configuration!

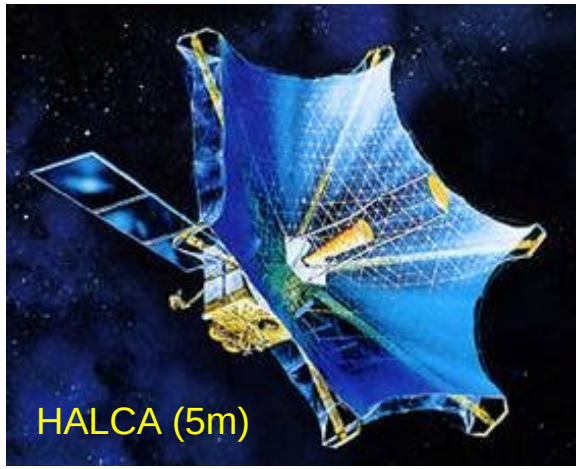
So real-time downlink to 4 SC 2x as good as 3!



Space-based VLBI HISTORY

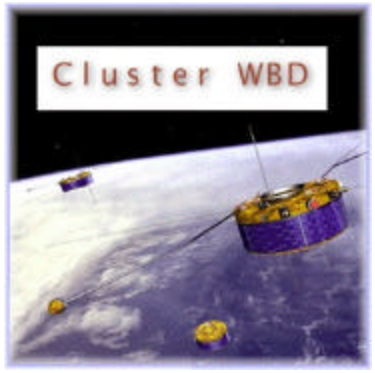
- ISEE 1,2 (1987): AKR sizes only
- TDRSS (1988) demonstration fringes
- HALCA (1999-present) Radio astronomy
- Cluster II (2001-) First multi-spacecraft VLBI operations
- ARISE (2008?) First large aperture VLBI spacecraft





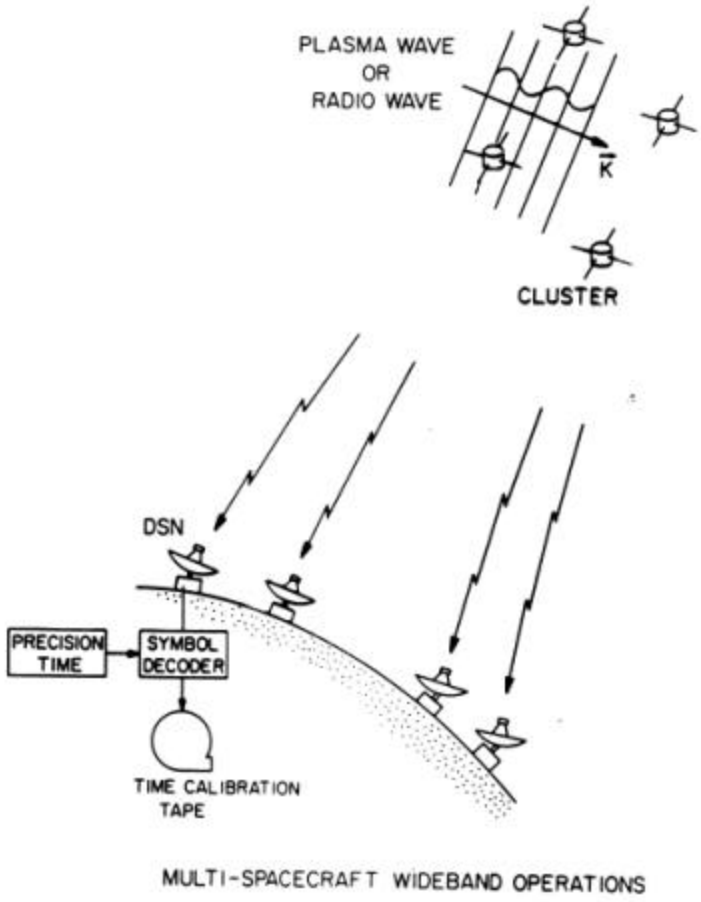
esa SCIENCE

NASA



Cluster VLBI: Scheduling Requirements

- Real-time DSN downlink (at least 3 spacecraft, requires 3+ DSN telescopes)
- Accurate (μsec) time stamps
- Downlink scheduled in nominal science mode (27 hr of 57 hr)
- Request 2 hr multi-spacecraft coverage per orbit (57 hr)
- Must be scheduled during 'scientifically optimal' configurations

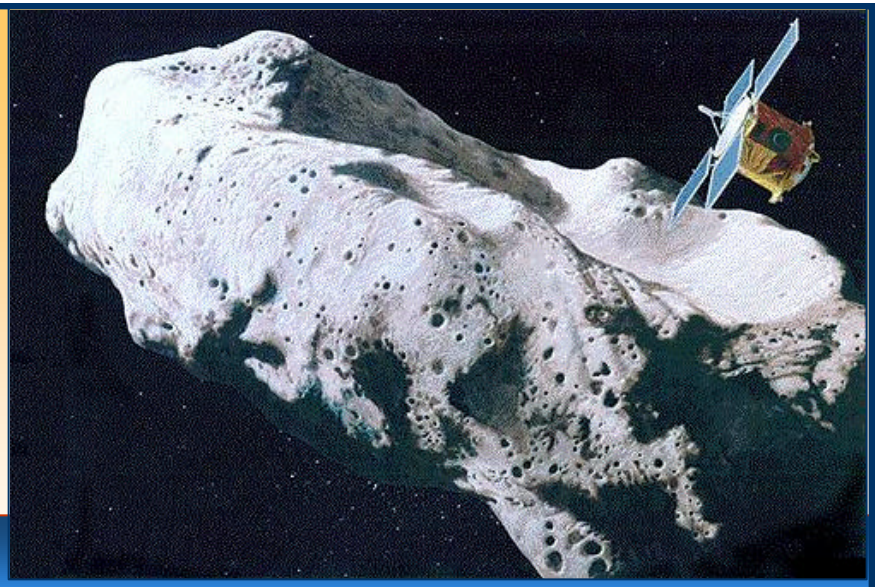


MULTI-SPACECRAFT WIDEBAND OPERATIONS

Joint Users Resource Allocation Planning Committee

SPECIAL REPORT

NEAR



Orbiting and Landing on an Asteroid: Navigation Challenges for NEAR Shoemaker

April 19, 2001

Dr. Bobby G. Williams and James K. Miller

Navigation and Mission Design Section

JPL

http://near.jhuapl.edu/

Johns Hopkins University Applied Physics Laboratory

NEAR Shoemaker Orbit Phase

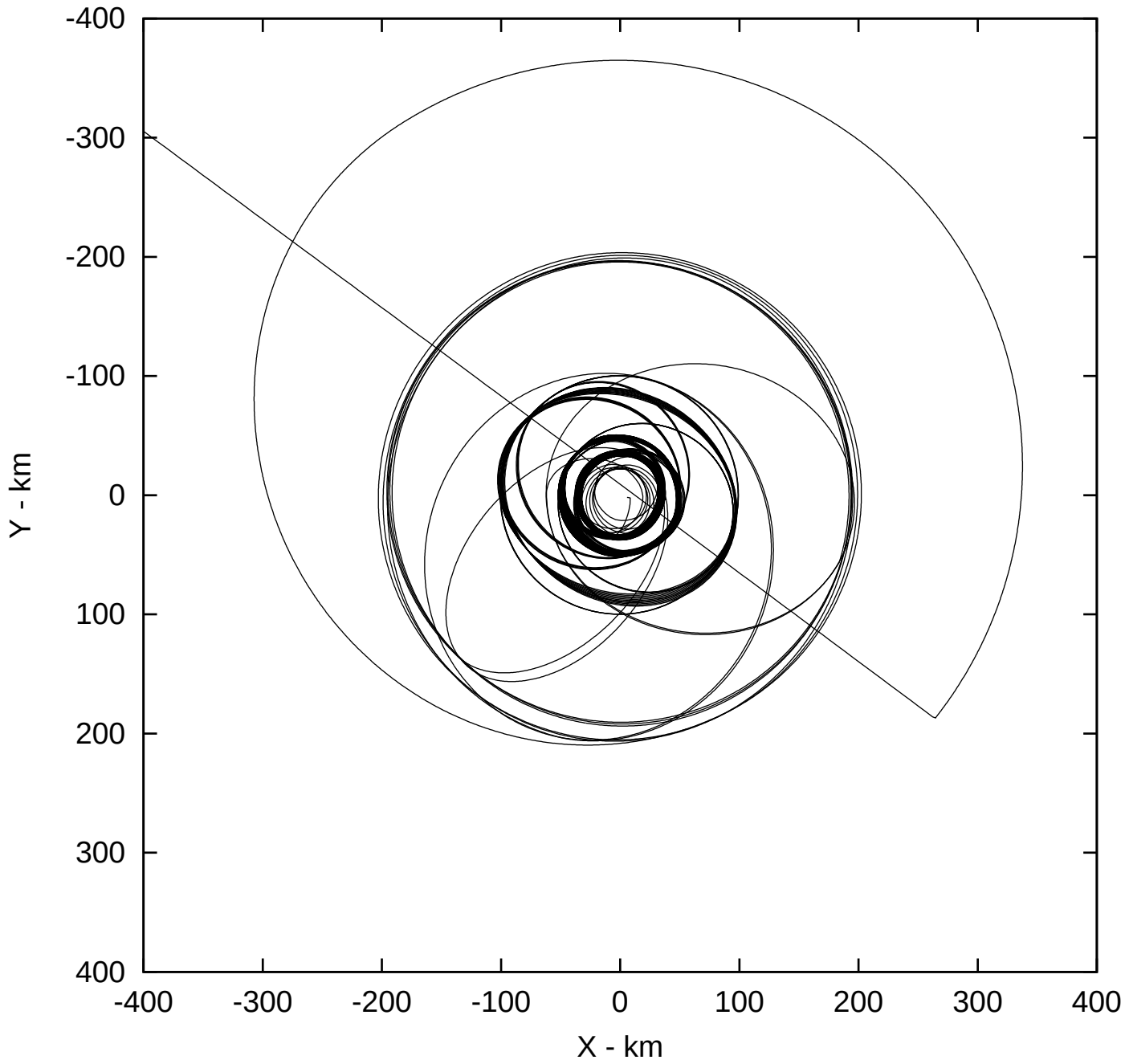
- Orbit phase from insertion burn on Feb. 14, 2000 to landing on Feb. 12, 2001
- Included:

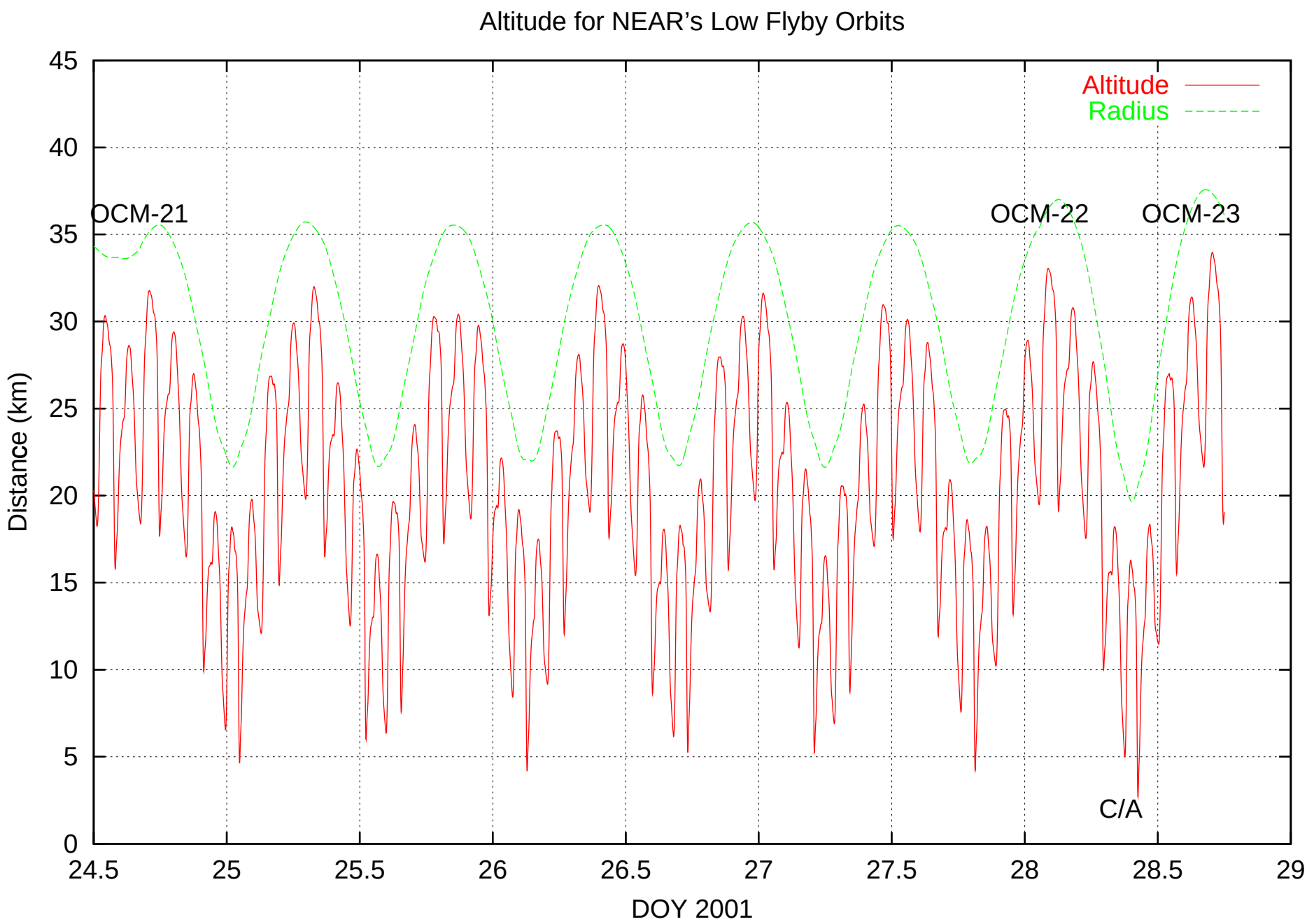
50x50 km polar	75 d
35x35 km polar	10 d
35x35 km equatorial	57 d

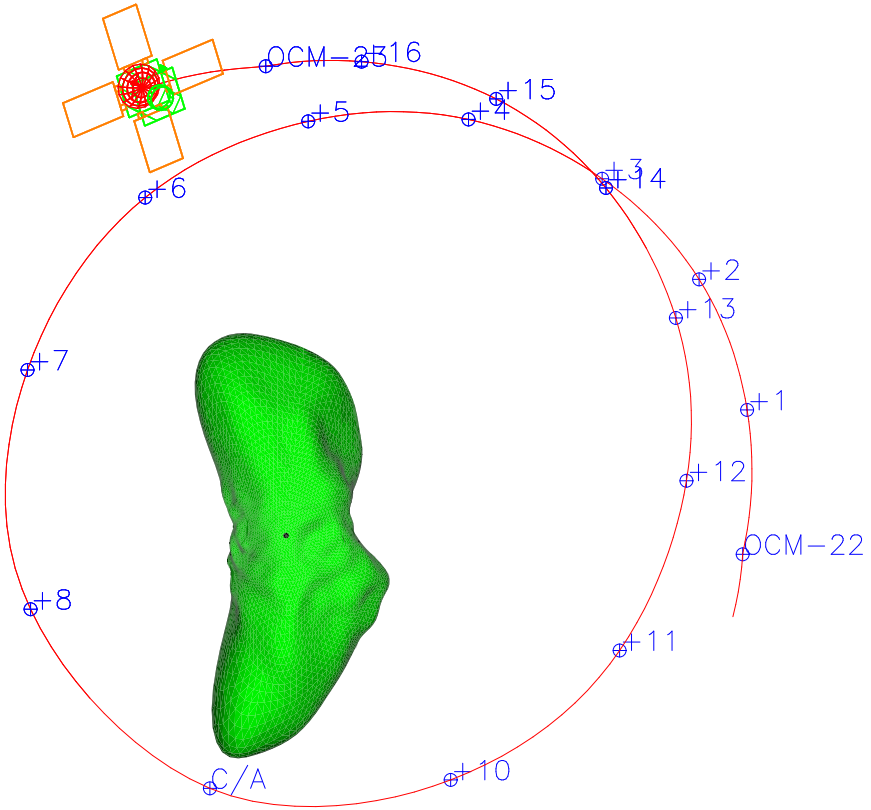
- Close Flybys:

October 26, 2000	6 km alt.
January 28, 2001	2.7 km alt.

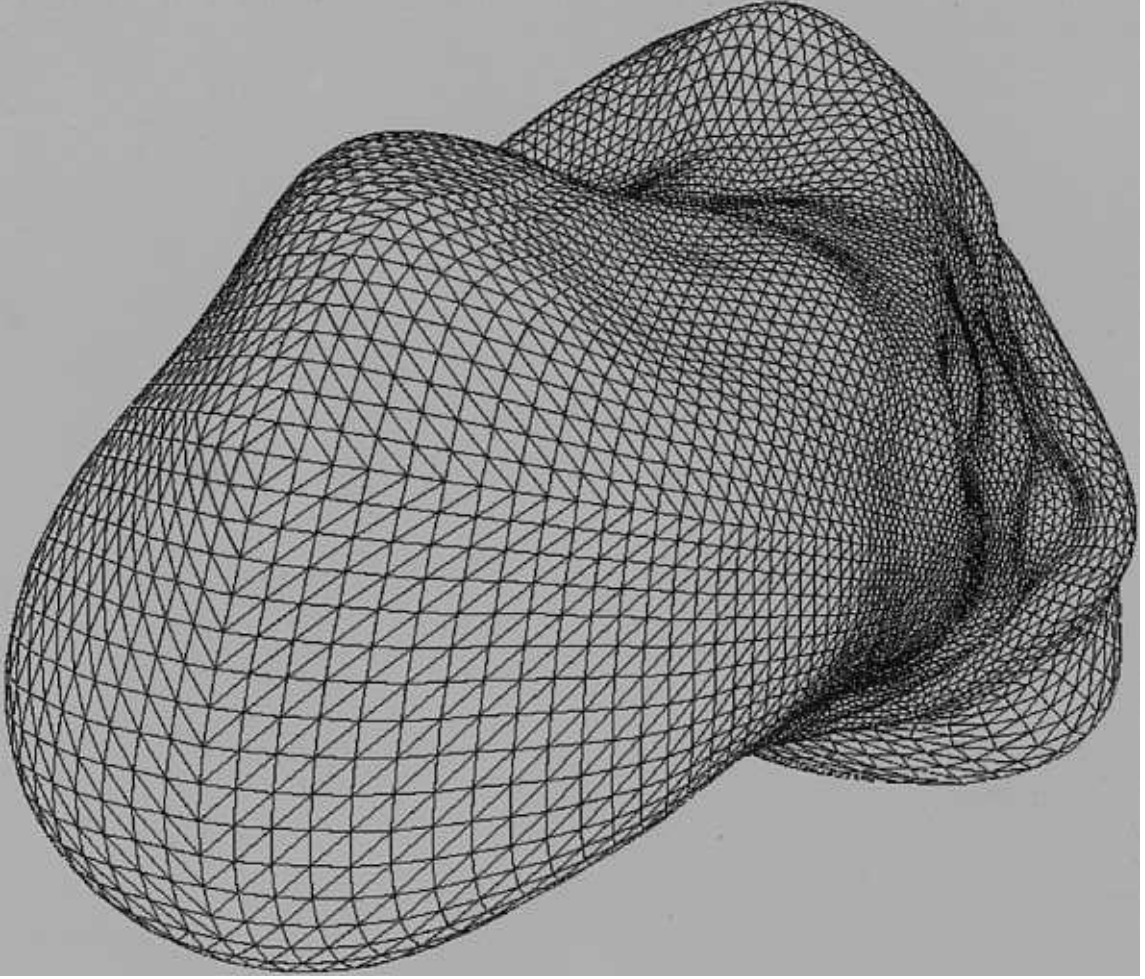
- Orbit phase re-planned seven times after insertion.
- End of mission close flybys re-planned at least 3 times.
- Controlled descent and landing plan at least 3 times.


-400
-300
-200
-100
0
100
200
300
400
Y - km
X - km

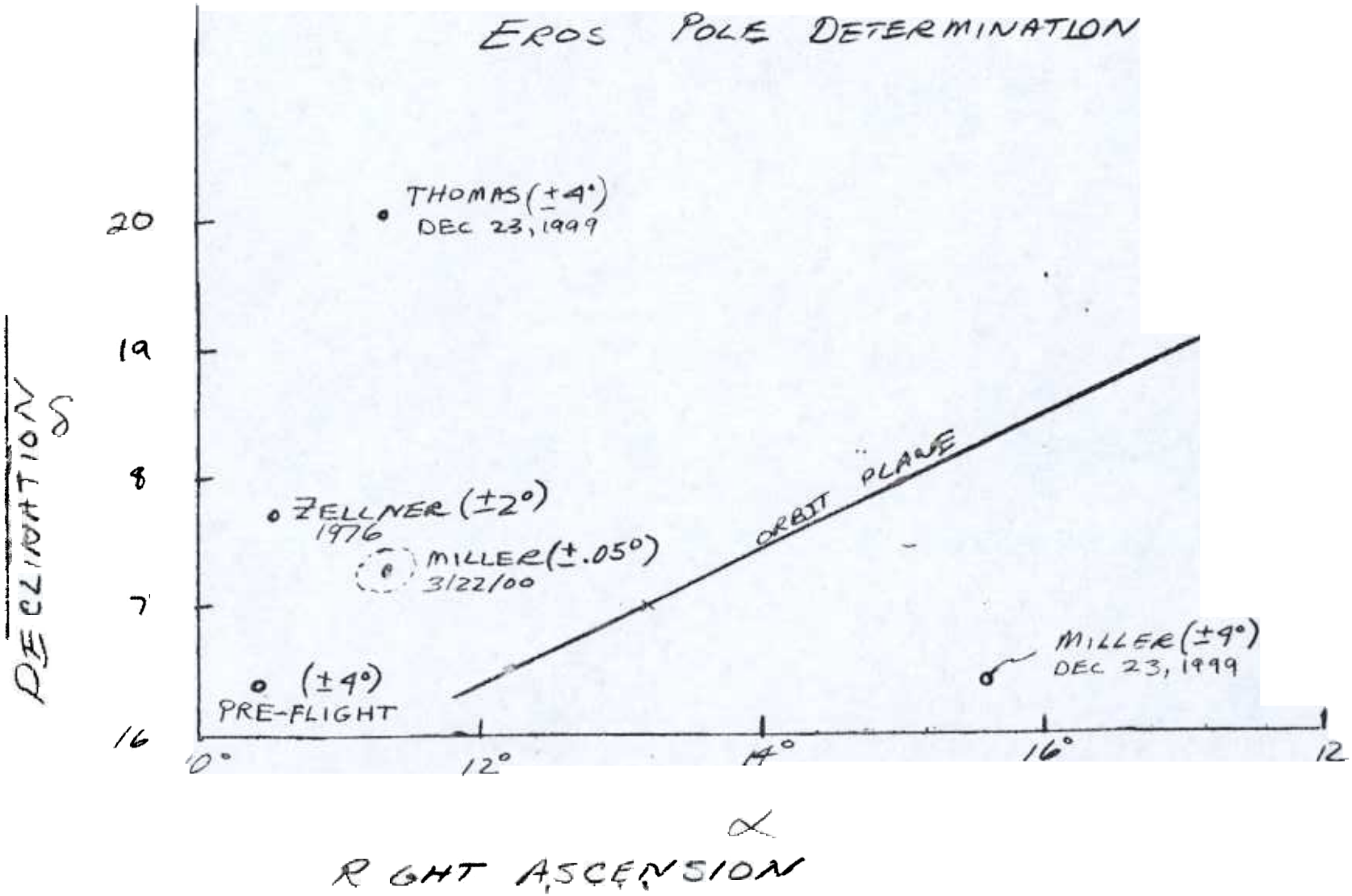

Altitude for NEAR's Low Flyby Orbits
Altitude
Radius
OCM-21
OCM-22
OCM-23
C/A
Distance (km)
DOY 2001
0
5
10
15
20
25
30
35
40
45
24.5
25
25.5
26
26.5
27
27.5
28
28.5
29



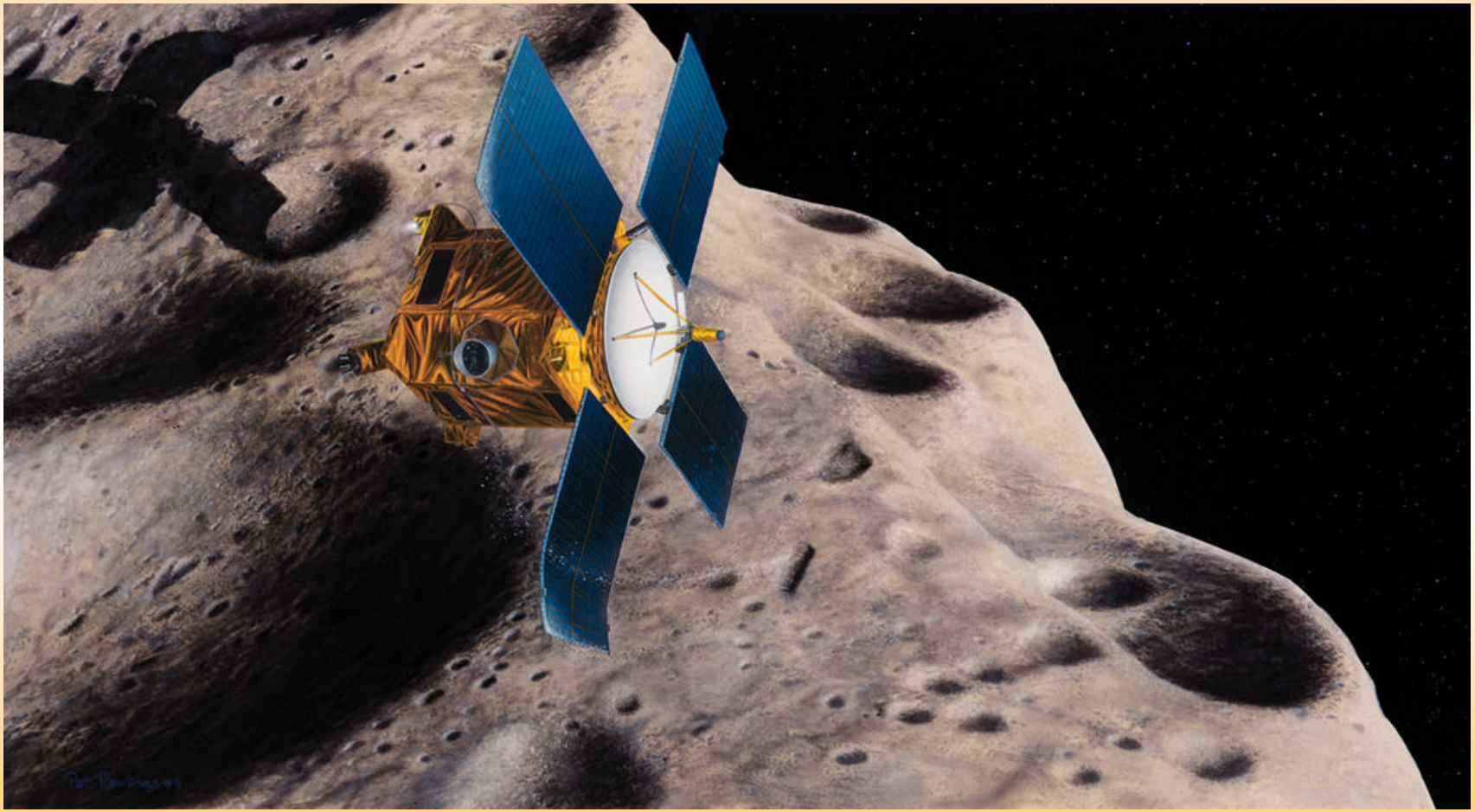
Asteroid Orientation at time of C/A:
28-JAN-2001 10:24:00.0000

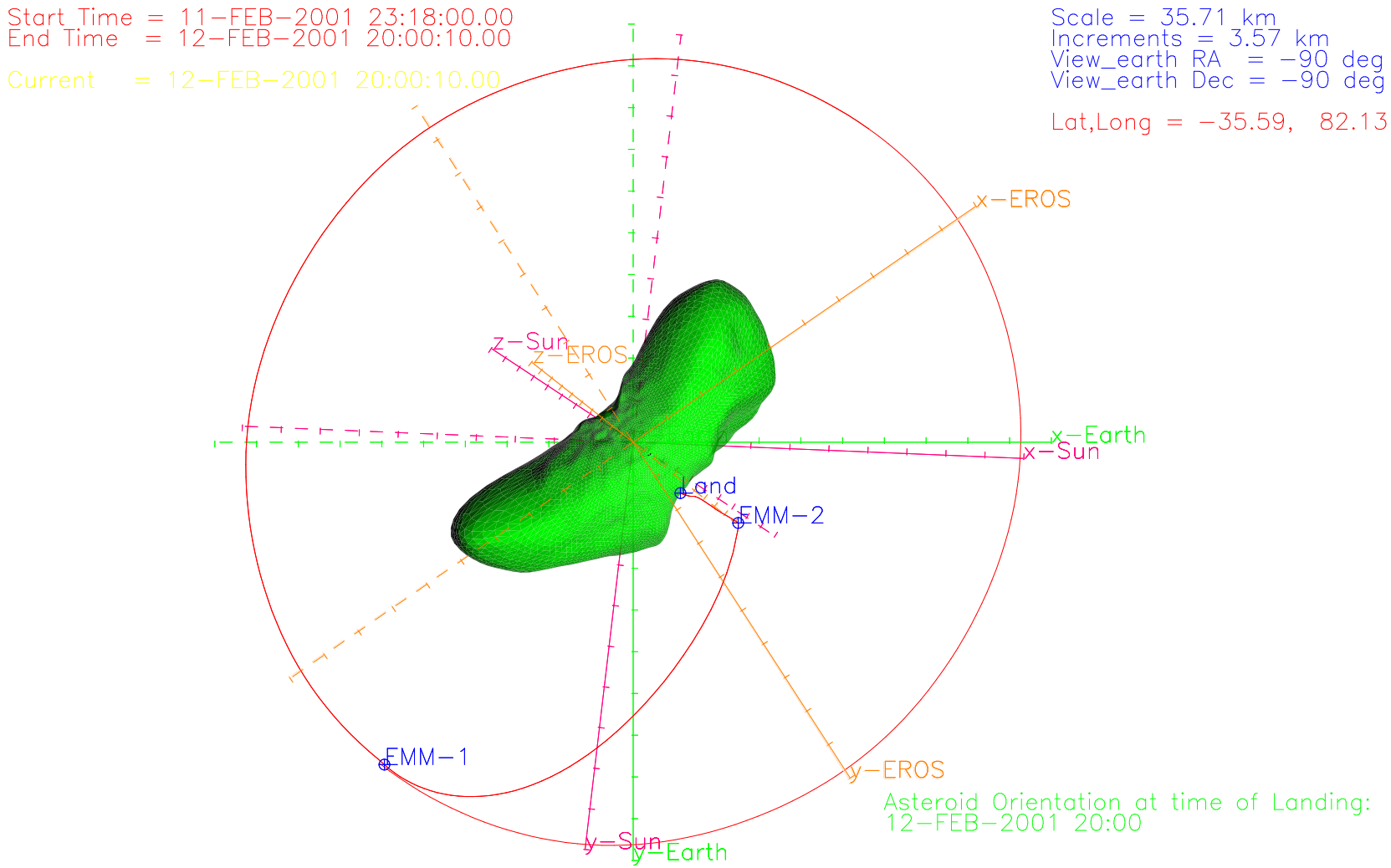


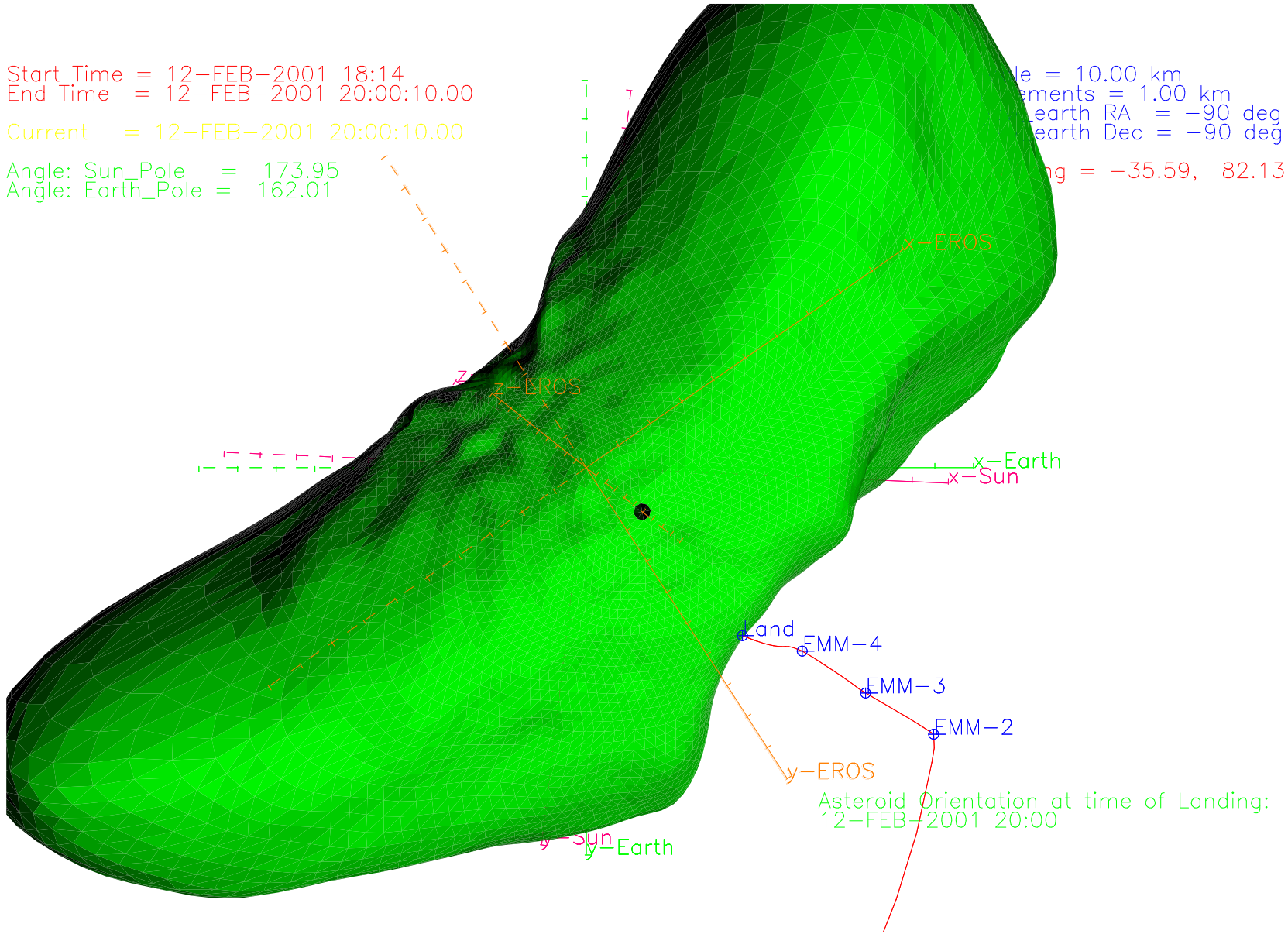
20x20
#44

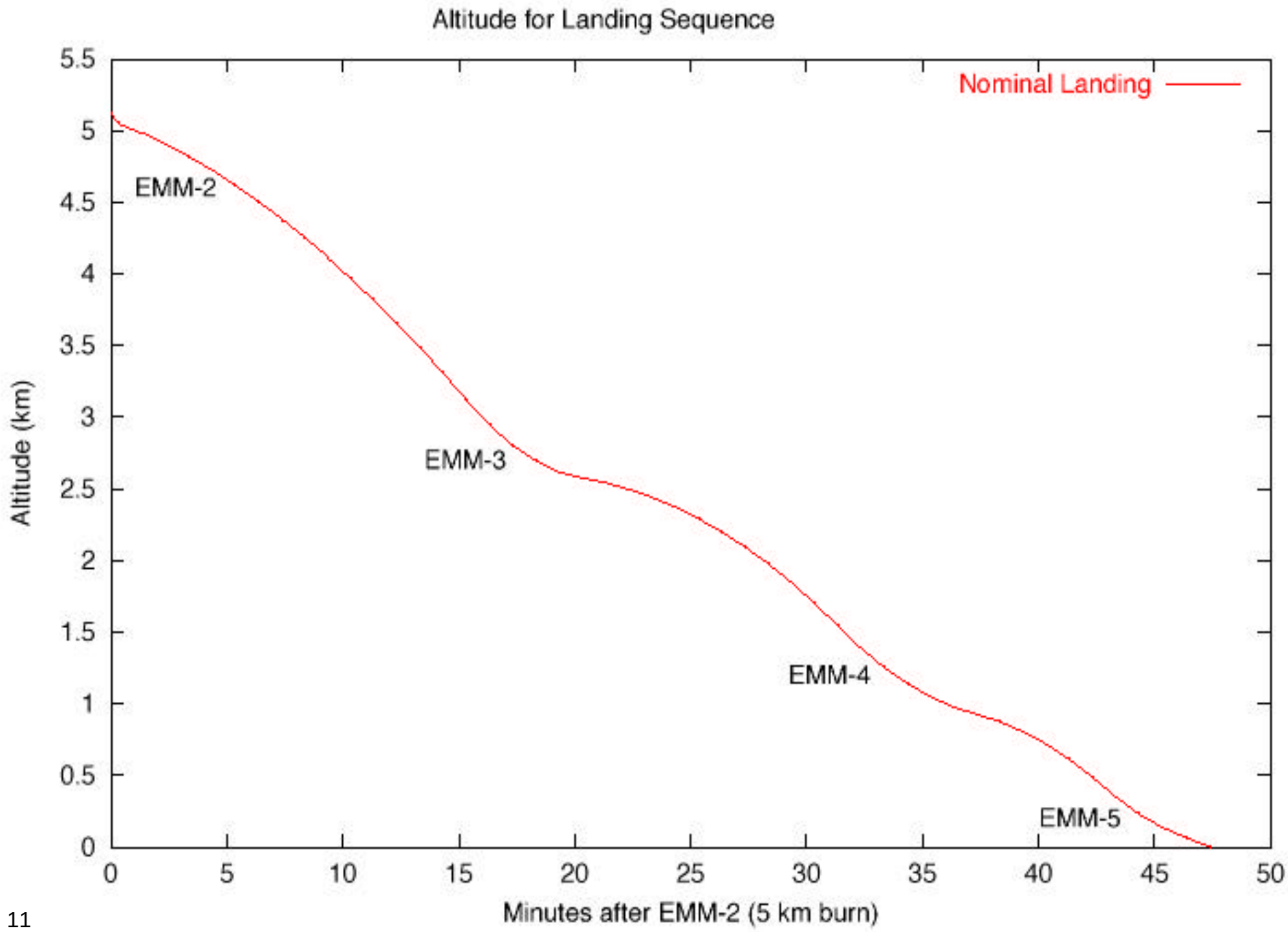

EROS POLE DETERMINATION
THOMAS (±4°)
DEC 23, 1999
20
19
8
7
16
ZELLNER (±2°)
1976
MILLER (±.05°)
3/22/00
ORBIT PLANE
MILLER (±9°)
DEC 23, 1999
(±4°)
PRE-FLIGHT
10°
12°
14°
16°
12
DECLINATION
δ
α
RIGHT ASCENSION

Landing on Eros

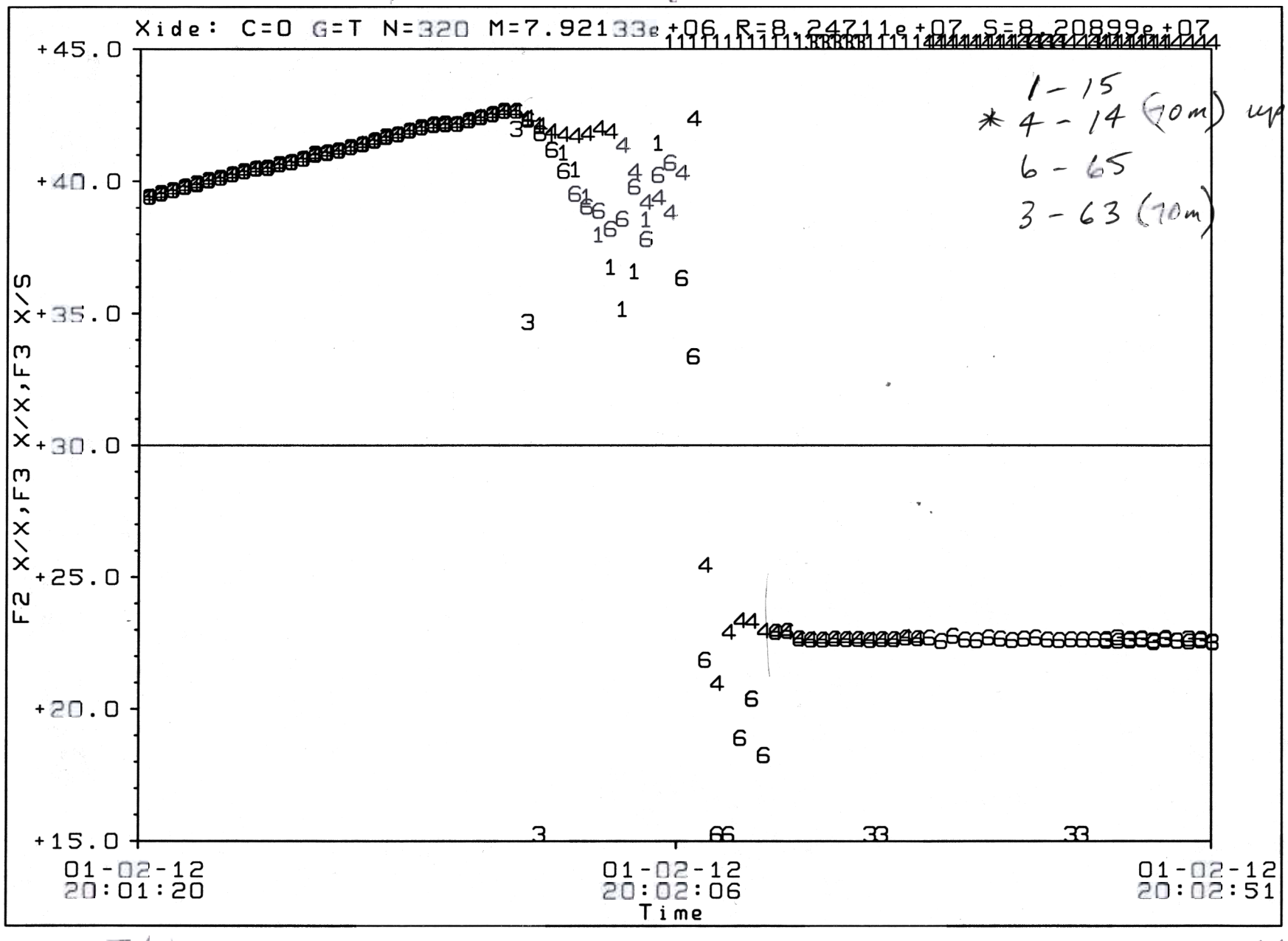



Start Time = 11-FEB-2001 23:18:00.00
End Time = 12-FEB-2001 20:00:10.00
Current = 12-FEB-2001 20:00:10.00
Scale = 35.71 km
Increments = 3.57 km
View_earth RA = -90 deg
View_earth Dec = -90 deg
Lat,Long = -35.59, 82.13
x-EROS
z-Sun
z-EROS
x-Earth
x-Sun
Land
EMM-2
EMM-1
y-EROS
y-Sun
y-Earth
Asteroid Orientation at time of Landing:
12-FEB-2001 20:00


Start Time = 12-FEB-2001 18:14
End Time = 12-FEB-2001 20:00:10.00
Current = 12-FEB-2001 20:00:10.00
Angle: Sun_Pole = 173.95
Angle: Earth_Pole = 162.01
le = 10.00 km
ements = 1.00 km
earth RA = -90 deg
earth Dec = -90 deg
ng = -35.59, 82.13
x-EROS
z-EROS
x-Earth
x-Sun
Land
EMM-4
EMM-3
EMM-2
y-EROS
Asteroid Orientation at time of Landing:
12-FEB-2001 20:00
y-Sun
y-Earth


Altitude for Landing Sequence
Nominal Landing
EMM-2
EMM-3
EMM-4
EMM-5
Altitude (km)
Minutes after EMM-2 (5 km burn)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
0
5
10
15
20
25
30
35
40
45
50

NEAR Landing DSN pseudo residuals

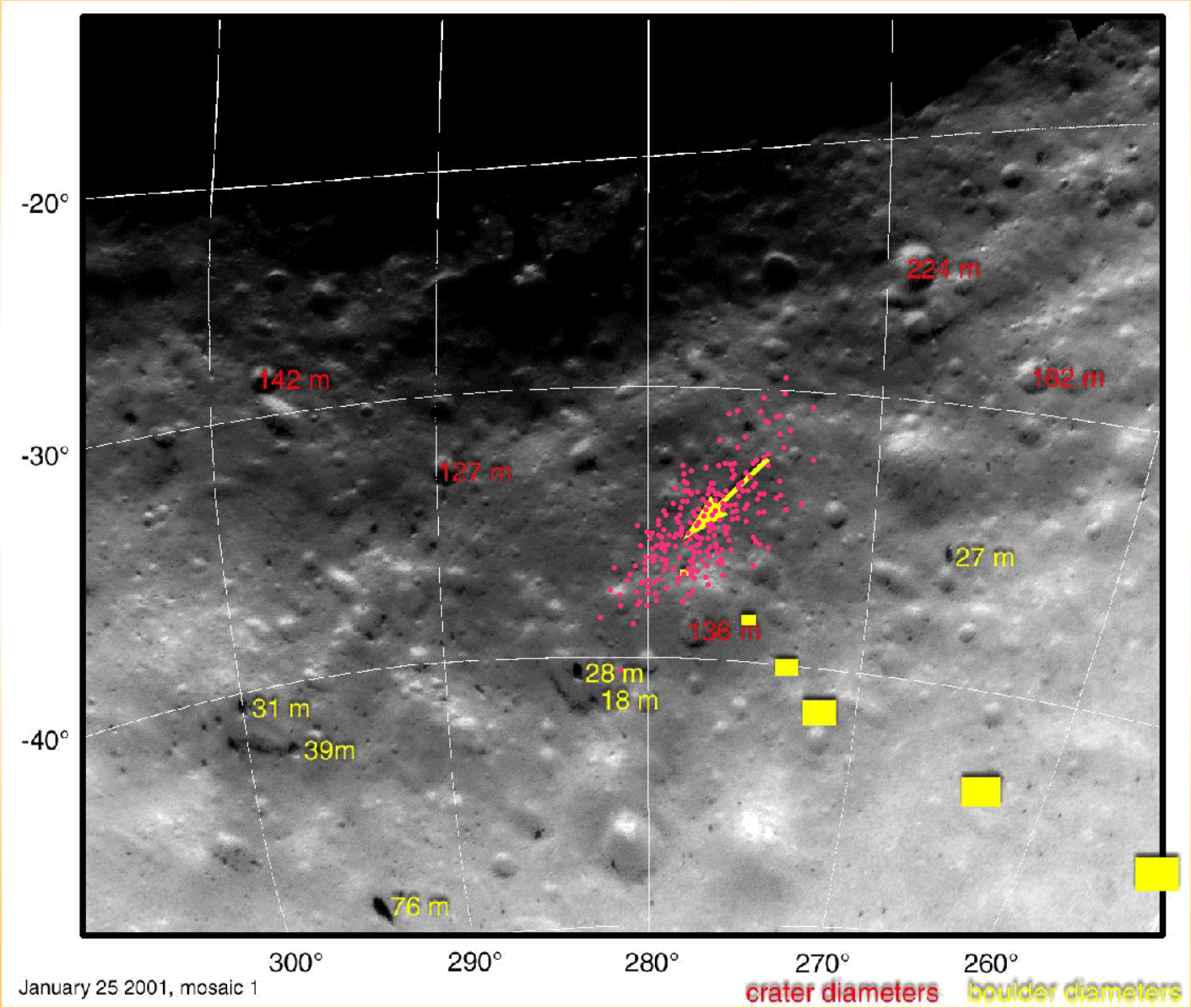


1 - 15
* 4 - 14 (70m) uplink
6 - 65
3 - 63 (70m)

start time
EMM-5 19 58 47

end time
EMM-5
7 03 08 94

Landing Dispersion



Picture Courtesy of Cornell

Post Landing Determination

- Landed February 12, 20:02:10 UTC (Earth received)
  - one way light time 17 min., 34.5 s
- Landing site 35.7 deg South, 80.5 deg East
  - about 100 m from nominal site
- Impact speed estimate
  - 1.5 to 1.8 m/s vertical
  - 0.2 to 0.3 m/s transverse

JOINT USERS RESOURCE ALLOCATION PLANNING COMMITTEE

Resource Analysis Team

Kevin Kim for
Napoleon Lacey

April 19, 2001

DSN User / Mission Planning Set
2000 - 2011

ONGOING/PLANNED PROJECTS				
Project	**Acronym**	**Launch or Start**	**EOPM**	**EOEM**
DSN VLBI Clock Sync and Catalog M&E	DSN	--	--	--
DSS Maintenance	DSS	--	--	--
European VLBI Network	EVN	--	--	--
Ground Based Radio Astronomy	GBRA	--	--	--
Space Geodesy	SGP	--	--	--
Voyager 2	VGR2	08/20/77	10/15/89	12/31/19
Voyager 1	VGR1	09/05/77	12/31/80	12/31/19
Goldstone Solar System Radar	GSSR	04/01/85	--	--
Galileo	GLL	10/18/89	12/07/97	01/15/03
Ulysses	ULS	10/06/90	09/11/95	12/31/04
ISTP - Geotail	GEOT	07/24/92	07/24/95	09/30/05
ISTP - Wind	WIND	11/01/94	11/01/97	09/30/05
Space VLBI	SVLB	02/01/95	09/30/01	- - -
ISTP - SOHO	SOHO	12/02/95	05/02/98	12/30/05
ISTP - Polar	POLR	02/22/96	08/23/97	09/30/05
Gravity Probe B	GRVB	06/01/96	10/31/03	TBD
Mars Global Surveyor	MGS	11/07/96	02/01/01	05/10/04
Highly Advanced Laboratory for Communications and Astronomy	VSOP	02/12/97	09/30/01	- - -
Advance Composition Explorer	ACE	08/25/97	02/01/01	12/31/04
Cassini	CAS	10/15/97	06/30/08	06/30/10
NOZOMI (Planet-B)	NOZO	07/03/98	TBD	TBD
Deep Space 1	DS1	10/24/98	09/19/99	10/31/01
Stardust	SDU	02/07/99	01/14/06	- - -
Chandra X-ray Observatory	CHDR	07/23/99	07/23/04	07/23/09
Imager for Magnetopause-to-Aurora Global Exploration	IMAG	03/25/00	03/30/02	03/30/03
Cluster 2 - S/C #2 (Samba)	CLU2	07/16/00	02/15/03	09/19/05
Cluster 2 - S/C #3 (Rumba)	CLU3	07/16/00	02/15/03	09/19/05
Cluster 2 - S/C #1 (Salsa)	CLU1	08/09/00	02/15/03	09/19/05
Cluster 2 - S/C #4 (Tango)	CLU4	08/09/00	02/15/03	09/19/05
2001 Mars Odyssey	M01O	04/07/01	08/01/04	09/19/07
Microwave Anisotropy Probe	MAP	06/30/01	07/21/03	09/30/06
Genesis	GNS	07/30/01	10/16/04	- - -
International Gamma Ray Astrophysics Lab	INTL	04/22/02	06/23/04	06/23/07
Comet Nucleus Tour (CONTOUR)	CNTR	07/01/02	08/31/08	TBD
Space Infrared Telescope Facility	SRTF	07/15/02	09/14/07	- - -
RadioAstron*	RADA	10/01/02	10/01/07	TBD
Rosetta	ROSE	01/13/03	10/23/12	- - -

* Planning dates

DSN User / Mission Planning Set

2000 - 2011

ADVANCED PLANNING PROJECTS				
Project	**Acronym**	**Launch or Start**	**EOPM**	**EOEM**
Mars Express Orbiter	MEX	06/01/03	12/01/05	07/31/08
Mars Exploration Rover - A	MERA	05/30/03	04/06/04	- - -
Mars Exploration Rover - B	MERB	06/27/03	05/10/04	- - -
Deep Impact	DEEP	01/02/04	08/02/05	- - -
Messenger	MSGR	03/23/04	09/30/10	- - -
Stereo Ahead	STA	11/26/04	02/04/07	02/04/10
Stereo Behind	STB	11/26/04	03/15/07	03/15/10
Mars Reconnaissance Orbiter	MRO	08/17/05	02/27/16	
Europa Orbiter	EURO	01/03/06	TBD	TBD
StarLight	SL	07/01/06	06/30/07	- - -
Highly Advanced Laboratory for Communications and Astronomy	VSP2	01/01/07	01/01/12	- - -
Mars Smart Lander 2007	M07L	09/04/07	08/19/10	TBD
Mars Scout 2007	M07S	09/04/07	11/19/08	TBD
Mars CNES Orbiter 2007	M07O	09/09/07	08/11/08	08/12/10
Mars ASI/NASA Telecom Orbiter 2007	M07T	09/09/07	08/09/18	TBD
ARISE	ARSE	01/01/08	01/01/13	- - -
Mars ASI/NASA Science Orbiter 2009	M09O	10/04/09	08/29/12	TBD
Mars CNES MSR Lander 2011	M11L	10/30/11	09/10/14	TBD
Mars CNES MSR Orbiter 2011	M11O	10/30/11	07/22/14	TBD

TMOD Resource Implementation Planning Matrix

Station	Subnet	First Delivery Date	S-Band Down	S-Band Up	X-Band Down	X-Band Up	Ka-Band Down	Ka-Band Up	Ku-Band Up and Down	Close
DSS-14	70M	XXXX	XXXX	XXXX	XXXX	XXXX	TBD	N/A	N/A	N/A
DSS-15	34HEF	XXXX	XXXX	N/A	XXXX	XXXX	TBD	N/A	N/A	N/A
DSS-16	26M	XXXX	XXXX	XXXX	N/A	N/A	N/A	N/A	N/A	N/A
DSS-24	34B1	XXXX	XXXX	XXXX	XXXX	5/1/2003	10/1/2005	N/A	N/A	N/A
DSS-25	34B2	XXXX	N/A	N/A	XXXX	XXXX	XXXX	5/1/2001	N/A	N/A
DSS-26	34B2	8/1/2002*	N/A	N/A	8/1/2002*	8/1/2002*	4/1/2003	N/A	N/A	N/A
DSS-27	34HSB	XXXX	XXXX	XXXX	N/A	N/A	N/A	N/A	N/A	N/A
DSS-28	34B2	TBD	N/A	N/A	TBD	TBD	N/A	N/A	N/A	N/A
DSS-33	11M	XXXX	N/A	N/A	XXXX	XXXX	N/A	N/A	XXXX	2/1/2002
DSS-34	34B1	XXXX	XXXX	XXXX	XXXX	XXXX	11/30/2004	N/A	N/A	N/A
DSS-43	70M	XXXX	XXXX	XXXX	XXXX	XXXX	TBD	N/A	N/A	N/A
DSS-45	34HEF	XXXX	XXXX	N/A	XXXX	XXXX	TBD	N/A	N/A	N/A
DSS-46	26M	XXXX	XXXX	XXXX	N/A	N/A	N/A	N/A	N/A	N/A
DSS-53	11M	XXXX	N/A	N/A	XXXX	XXXX	N/A	N/A	XXXX	2/1/2002
DSS-54	34B1	XXXX	XXXX	XXXX	XXXX	XXXX	8/1/2006	N/A	N/A	N/A
DSS-55	34B2	11/1/2003	N/A	N/A	11/1/2003	11/1/2003	11/1/2003	N/A	N/A	N/A
DSS-63	70M	XXXX	XXXX	XXXX	XXXX	10/11/2001	TBD	N/A	N/A	N/A
DSS-65	34HEF	XXXX	XXXX	N/A	XXXX	XXXX	TBD	N/A	N/A	N/A
DSS-66	26M	XXXX	XXXX	XXXX	N/A	N/A	N/A	N/A	N/A	N/A

* = DSS-26 X-Band Operational Early to cover DSS-15 NSP Downtime, 8/1/02 - 09/27/02.
Will be removed from service 10/1/02 - 4/1/03 for NSP and X/X/Ka Implementation upon return of DSS-15.

XXXX = Capability Currently Exists
N/A = Capability Not Planned

4/19/2001

RESOURCE ALLOCATION AND PLANNING

JURAP - APRIL 19, 2001

- **RESOURCE NEGOTIATION STATUS**
  - 2001 WEEK 24 (THRU 06/17/2001) WAS RELEASED TO DSN ON 04/09/2001
  - 2001 WEEK 25 (THRU 06/24/2001) IS DUE TO BE RELEASED ON 04/23/2001
  - 2001 WEEKS 35 - 37 (THRU 09/16/2001) WILL GO INTO NEGOTIATIONS STARTING 05/01/2001

RESOURCE ALLOCATION AND PLANNING

Joint Users Resource Allocation Committee

- **SPECIAL STUDIES/ACTIVITIES**
  - STEREO LOAD STUDY
  - ULYSIS REQUIREMENTS ANALYSIS

- **ON-GOING ACTIVITIES**
  - MADB/TIGRAS TESTING AND TRAINING
  - DEEP IMPACT LOAD STUDY
  - GALILEO EXTENDED MISSION STUDY
  - GENESIS STUDY
  - IMAGE LOAD STUDY
  - MEX LOAD STUDY
  - MRO LOAD STUDY

TELECOMMUNICATIONS AND MISSION OPERATIONS DIRECTORATE

JPL *Resource Allocation Planning & Scheduling Office (RAPSO)*

JOINT USERS RESOURCE ALLOCATION PLANNING COMMITTEE

DSS DOWNTIME FORECAST

Jose Valencia

April 19, 2001

NASA Jet Propulsion Laboratory

DSN Downtime & Test Schedule is located on the RAP WWW Homepage at: http://rapweb.jpl.nasa.gov

Although every effort is made to ensure the accuracy of this Downtime Planning report, changes can and do occur. The DSN 7-Day Schedule takes precedence over this document.

FACILITY	TASK	SCHEDULE	DURATION
DSS-14	Antenna Controller Replacement	Weeks 28 – 40 / 2004	13 Weeks
CANBERRA			
DSS-43	Antenna Controller Replacement	*07/26/04 - 10/03/04 No Proposal (possible in 2005)	10 Weeks
MADRID			
DSS-63	Antenna Controller Replacement	*10/11/04 - 12/19/04 No Proposal (possible in 2005)	10 Weeks
DSS-65	Antenna Controller Replacement	Weeks 07 - 13 / 2004	7 Weeks

*Request Window: Earliest Start - Latest Finish

Antenna Controller Replacement implementation priority:

1. Goldstone
2. Canberra
3. Madrid

One month turn-a-round between each complex is needed.

MAJOR DSN DOWNTIMES by DATE

The highlighted rows indicate changes made since last JURAP 1/18/01.

Year	Site	Description	Start	End	Duration (Days)	Weeks	Start DOY	End DOY
2001	DSS 63	70M X-Band Uplink	07/23/01	10/10/01	80	30-41	204	283
2001	DSS 63	NIB - Feedcone Structure	07/23/01	10/10/01	80	30-41	204	283
2001	DSS 63	NIB - Hydrostatic Bearing Regrout	07/23/01	10/10/01	80	30-41	204	283
2001	DSS 63	NIB - Counterweight Rebalance	07/23/01	10/10/01	80	30-41	204	283
2001	DSS 63	NIB - Az Cablewrap Rehab	07/23/01	10/10/01	80	30-41	204	283
2001	DSS 63	NIB - Chiller+HtExch HVAC Mods	07/23/01	10/10/01	80	30-41	204	283
2001	DSS 16	Servo Hydraulic Drive Replacement	08/20/01	09/16/01	28	34-37	232	259
2002	DSS 66	Servo Hydraulic Drive Replacement	06/24/02	07/21/02	28	26-29	175	202
2002	DSS 14	70M Servo Drive Upgrade	07/15/02	09/27/02	75	29-39	196	270
2002	DSS 14	NIB - NSP Implementation	07/15/02	09/27/02	75	29-39	196	270
2002	DSS 15	NSP Implementation	08/01/02	09/27/02	58	31-39	213	270
2002	DSS 24	NSP Implementation	10/01/02	11/22/02	53	40-47	274	326
2002	DSS 45	NSP Implementation	10/01/02	11/22/02	53	40-47	274	326
2002	DSS 54	NSP Impementation	10/01/02	11/22/02	53	40-47	274	326
2002	DSS 26	NSP Test and Training	10/01/02	03/30/03	181	40-13	274	089
2002	DSS 24	NIB - 20kwatt X-Band Txr Installation	10/01/02	11/22/02	53	40-47	274	326
2002	DSS 54	NIB - 20kwatt X-Band Txr Installation	10/01/02	11/22/02	53	40-47	274	326
2002	DSS 43	70M Servo Drive Upgrade	11/25/02	02/09/03	77	48-06	329	040
2002	DSS 43	NIB - Ball-Joint Pad Refurbishment	11/25/02	02/09/03	77	48-06	329	040
2002	DSS 43	NIB - NSP Implementation	12/02/02	02/09/03	70	49-06	336	040
2002	DSS 65	NSP Implementation	12/02/02	02/09/03	70	49-06	336	040
2003	DSS 63	70M Servo Drive Upgrade	02/10/03	04/20/03	70	07-16	041	110
2003	DSS 63	NIB - Ball-Joint Pad Refurbishment	02/10/03	04/20/03	70	07-16	041	110
2003	DSS 63	NIB - NSP Implementation	02/10/03	04/06/03	56	07-14	041	096
2003	DSS 25	NSP Implementation	02/10/03	04/06/03	56	07-14	041	096
2003	DSS 34	NSP Implementation	02/10/03	04/06/03	56	07-14	041	096
2003	DSS 25	NIB - 20kwatt X-Band Txr Installation	02/10/03	04/06/03	56	07-14	041	096
2003	DSS 34	NIB - 20kwatt X-Band Txr installation	02/10/03	04/06/03	56	07-14	041	096
2003	DSS 15	Antenna Controller Replacement	03/03/03	05/04/03	63	10-18	062	124
2003	DSS 46	Servo Hydraulic Drive Replacement	05/05/03	06/01/03	28	19-22	125	152
2003	DSS 45	Antenna Controller Replacement	09/08/03	10/25/03	48	37-43	251	298
2004	DSS 65	Antenna Controller Replacement	02/09/04	03/28/04	49	07-13	040	088
2004	DSS 14	Antenna Controller Replacement	07/05/04	10/03/04	91	28-40	187	277

MAJOR DSN DOWNTIMES by SITE by Year

The latest update is on:3/12/01 9:49:00 AM

*The highlighted portion indicates the last change made.

Year	Site	Description	Start	End	Duration (Days)	Weeks	Start DOY	End DOY
2001	DSS 16	Servo Hydraulic Drive Replacement	08/20/01	09/16/01	28	34-37	232	259
2001	DSS 63	70M X-Band Uplink	07/23/01	10/10/01	80	30-41	204	283
2001	DSS 63	NIB - Feedcone Structure	07/23/01	10/10/01	80	30-41	204	283
2001	DSS 63	NIB - Hydrostatic Bearing Regrout	07/23/01	10/10/01	80	30-41	204	283
2001	DSS 63	NIB - Counterweight Rebalance	07/23/01	10/10/01	80	30-41	204	283
2001	DSS 63	NIB - Az Cablewrap Rehab	07/23/01	10/10/01	80	30-41	204	283
2001	DSS 63	NIB - Chiller+HtExch HVAC Mods	07/23/01	10/10/01	80	30-41	204	283
2002	DSS 14	70M Servo Drive Upgrade	07/15/02	09/27/02	75	29-39	196	270
2002	DSS 14	NIB - NSP Implementation	07/15/02	09/27/02	75	29-39	196	270
2002	DSS 15	NSP Implementation	08/01/02	09/27/02	58	31-39	213	270
2002	DSS 24	NSP Implementation	10/01/02	11/22/02	53	40-47	274	326
2002	DSS 24	NIB - 20kwatt X-Band Txr Installation	10/01/02	11/22/02	53	40-47	274	326
2002	DSS 26	NSP Test and Training	10/01/02	03/30/03	181	40-13	274	089
2002	DSS 43	70M Servo Drive Upgrade	11/25/02	02/09/03	77	48-06	329	040
2002	DSS 43	NIB - Ball-Joint Pad Refurbishment	11/25/02	02/09/03	77	48-06	329	040
2002	DSS 43	NIB - NSP Implementation	12/02/02	02/09/03	70	49-06	336	040
2002	DSS 45	NSP Implementation	10/01/02	11/22/02	53	40-47	274	326
2002	DSS 54	NSP Impementation	10/01/02	11/22/02	53	40-47	274	326
2002	DSS 54	NIB - 20kwatt X-Band Txr Installation	10/01/02	11/22/02	53	40-47	274	326
2002	DSS 65	NSP Implementation	12/02/02	02/09/03	70	49-06	336	040
2002	DSS 66	Servo Hydraulic Drive Replacement	06/24/02	07/21/02	28	26-29	175	202
2003	DSS 15	Antenna Controller Replacement	03/03/03	05/04/03	63	10-18	062	124
2003	DSS 25	NSP Implementation	02/10/03	04/06/03	56	07-14	041	096
2003	DSS 25	NIB - 20kwatt X-Band Txr Installation	02/10/03	04/06/03	56	07-14	041	096
2003	DSS 34	NSP Implementation	02/10/03	04/06/03	56	07-14	041	096
2003	DSS 34	NIB - 20kwatt X-Band Txr installation	02/10/03	04/06/03	56	07-14	041	096
2003	DSS 45	Antenna Controller Replacement	09/08/03	10/25/03	48	37-43	251	298
2003	DSS 46	Servo Hydraulic Drive Replacement	05/05/03	06/01/03	28	19-22	125	152
2003	DSS 63	70M Servo Drive Upgrade	02/10/03	04/20/03	70	07-16	041	110
2003	DSS 63	NIB - Ball-Joint Pad Refurbishment	02/10/03	04/20/03	70	07-16	041	110
2003	DSS 63	NIB - NSP Implementation	02/10/03	04/06/03	56	07-14	041	096
2004	DSS 14	Antenna Controller Replacement	07/05/04	10/03/04	91	28-40	187	277
2004	DSS 65	Antenna Controller Replacement	02/09/04	03/28/04	49	07-13	040	088

TELECOMMUNICATIONS AND MISSION OPERATIONS DIRECTORATE

JPL *Deep Space Mission System Operations Program Office*

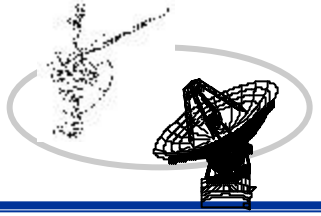
JOINT USERS RESOURCE ALLOCATION PLANNING MEETING

DSN Operations

Jim Hodder

April 19, 2001

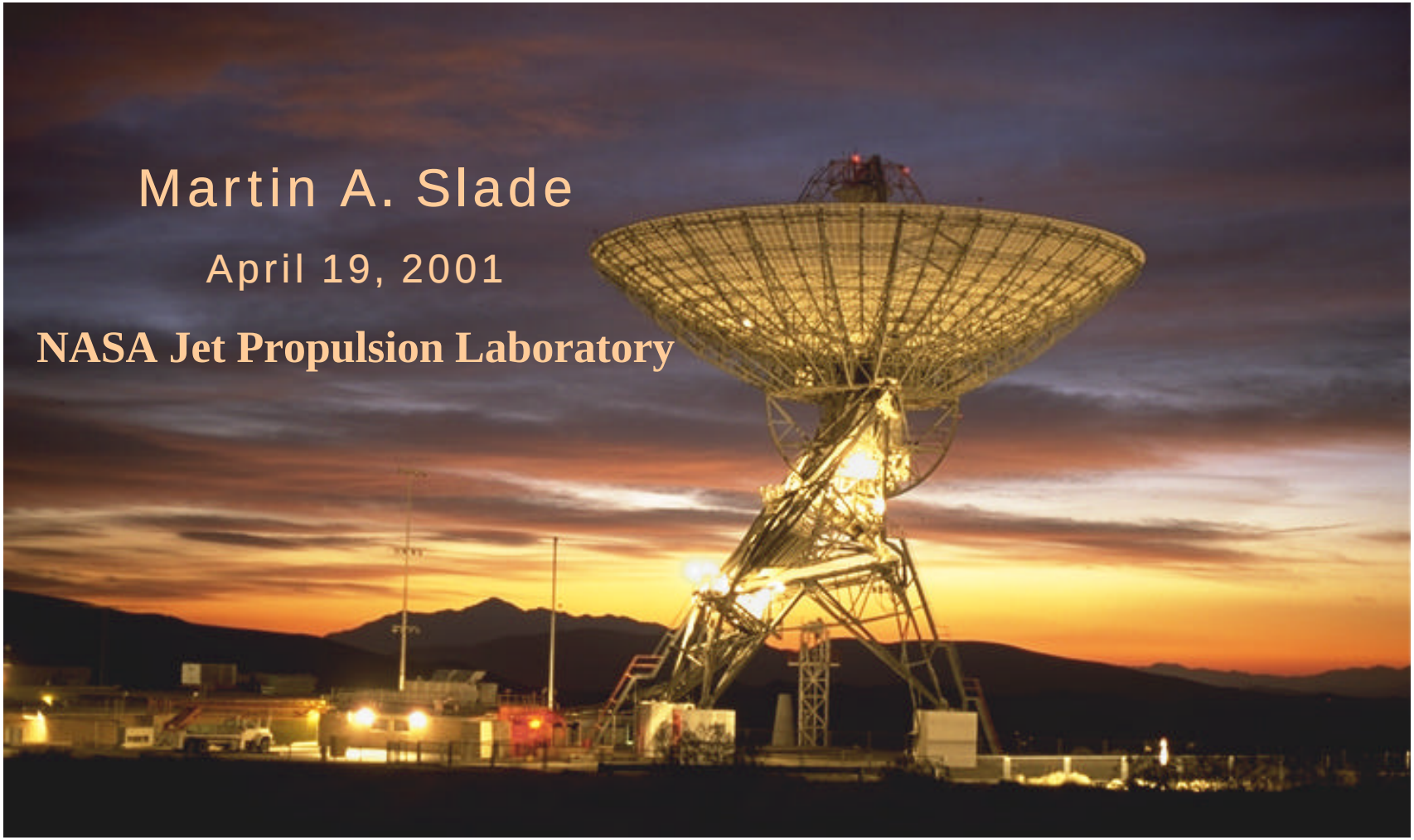
NASA Jet Propulsion Laboratory



DSN System Availability

Data Type	February 2001	March 2001
Telemetry	99.1%	97.2%
Tracking	98.5%	97.2%
Command	98.5%	97.6%
Monitor	99.3%	98.7%
Radio Science	99.9%	99.2%
VLBI	98.7%	98.5%

GOLDSTONE SOLAR SYSTEM RADAR



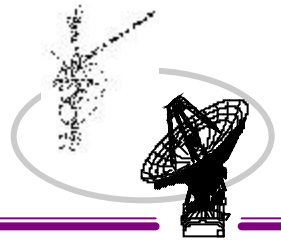
Martin A. Slade

April 19, 2001

NASA Jet Propulsion Laboratory

Joint Users Resource Allocation Planning Committee Meeting

GOLDSTONE SOLAR SYSTEM RADAR (GSSR)



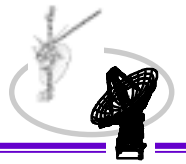
- **Observations of Near-Earth Asteroids 1998 SF36 (and 2000 EC16) were successful on March 20, 22, 24, 25, 26, 28, 29, 30, April 2, (and March 24 and March25), respectively**
- **1998 SF36 was recently selected as the Mission target for the joint Japanese/NASA MUSES-C Mission to land upon and return a sample from an asteroid. Thanks to all the users who gave up time for these critical observations, including Galileo, GBRA, Maintenance, NCT, PN10, SVLB, and VGR1**
- **Arecibo to Goldstone radar interferometric observations of Venus were successful on April 15, 2001, at DSS-14, DSS-13, and GAVRT, with excellent data from all 3 Goldstone antennas**
- **Four more Arecibo to GDSCC observations of Venus are scheduled for April 20, 29, May 7, and May 12**

Joint Users Resource Allocation Planning Committee

Radio Astronomy and Special Activities

George Martinez

April 19, 2001



TEMPO
(Time and Earth Motion Precision Observations)

- Clock Sync
  - DOY 069
    - No problems were reported by either DSS-15 or DSS-65.
    - Tapes sent to JPL Correlator for processing.
  - DOY 084
    - No problems were reported by either DSS-15 or DSS-65.
    - Tapes sent to JPL Correlator for processing.
  - Metrics
    - 2 observations – 100% of data time utilized.

Cat M&E

- DOY 077
  - No problems were reported by DSS-15.
  - DSS-45 reported a tape change problem.
  - Tapes sent to the JPL Correlator for processing.
- DOY 084
  - DSS-65 reported a vacuum failure.
  - DSS-15 had approximately 6 hours of fatal RFI from GSSR activity at DSS-14.
  - Tapes sent to the JPL Correlator for processing.
- Metrics
  - 98% of data time utilized.

Gravity Probe - B

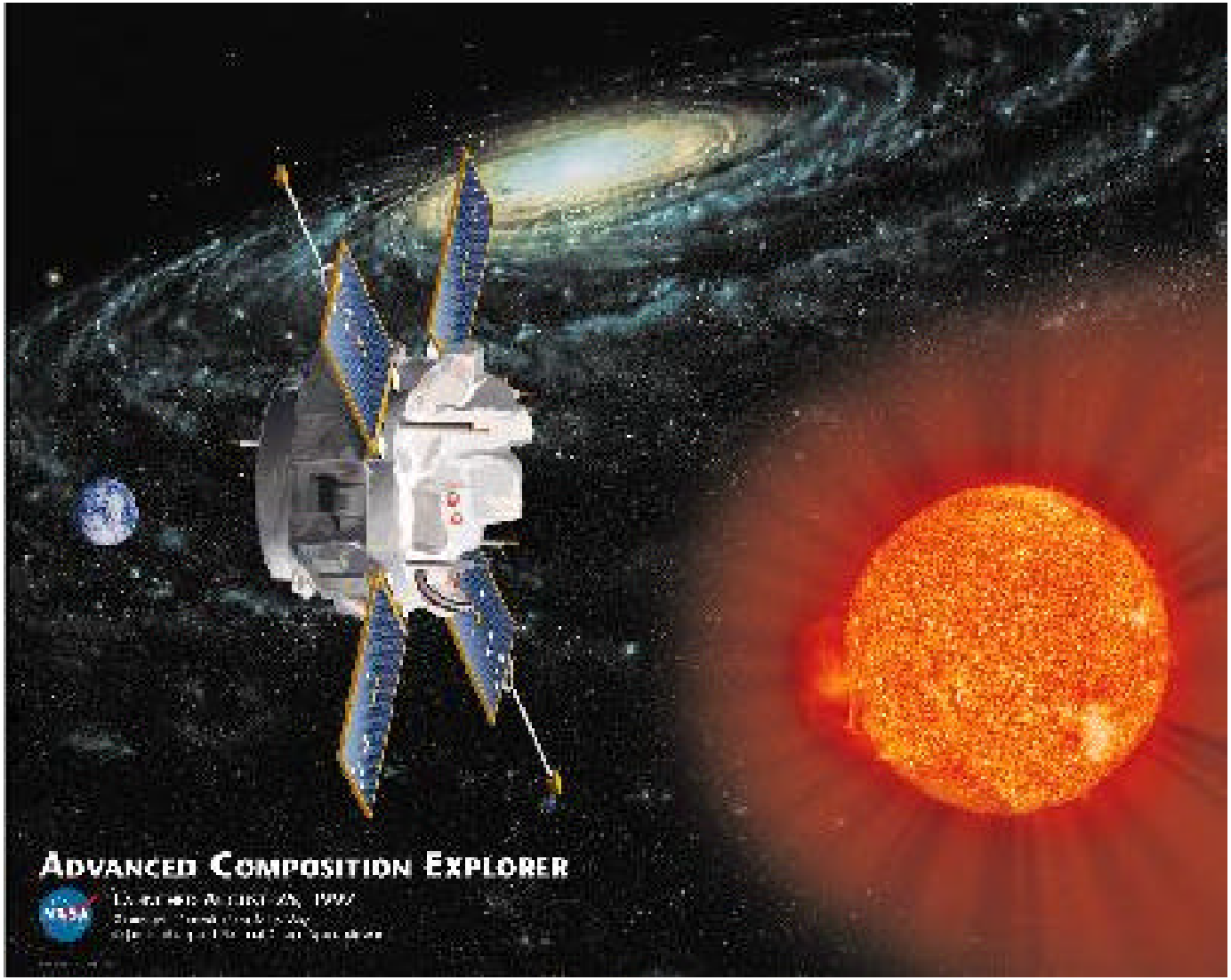
- BR071A
  - X-band dual polarization prelaunch guidestar survey.
  - DSS-14 and DSS-43 reported no problems.
  - DSS-63 reported a problem with the APA.
  - Tapes sent to the Socorro Correlator for processing.

- Metrics
  - 91.5% of data time utilized.

Ground Based Radio Astronomy (GBRA)

- **RA360**
  - **Detect Water MASERs in Active Galactic Nuclei (AGN).**
  - **No problems were reported by DSS-43**

Joint Users Resource Allocation Planning Committee



Advanced Composition Explorer (ACE)

A. Berman

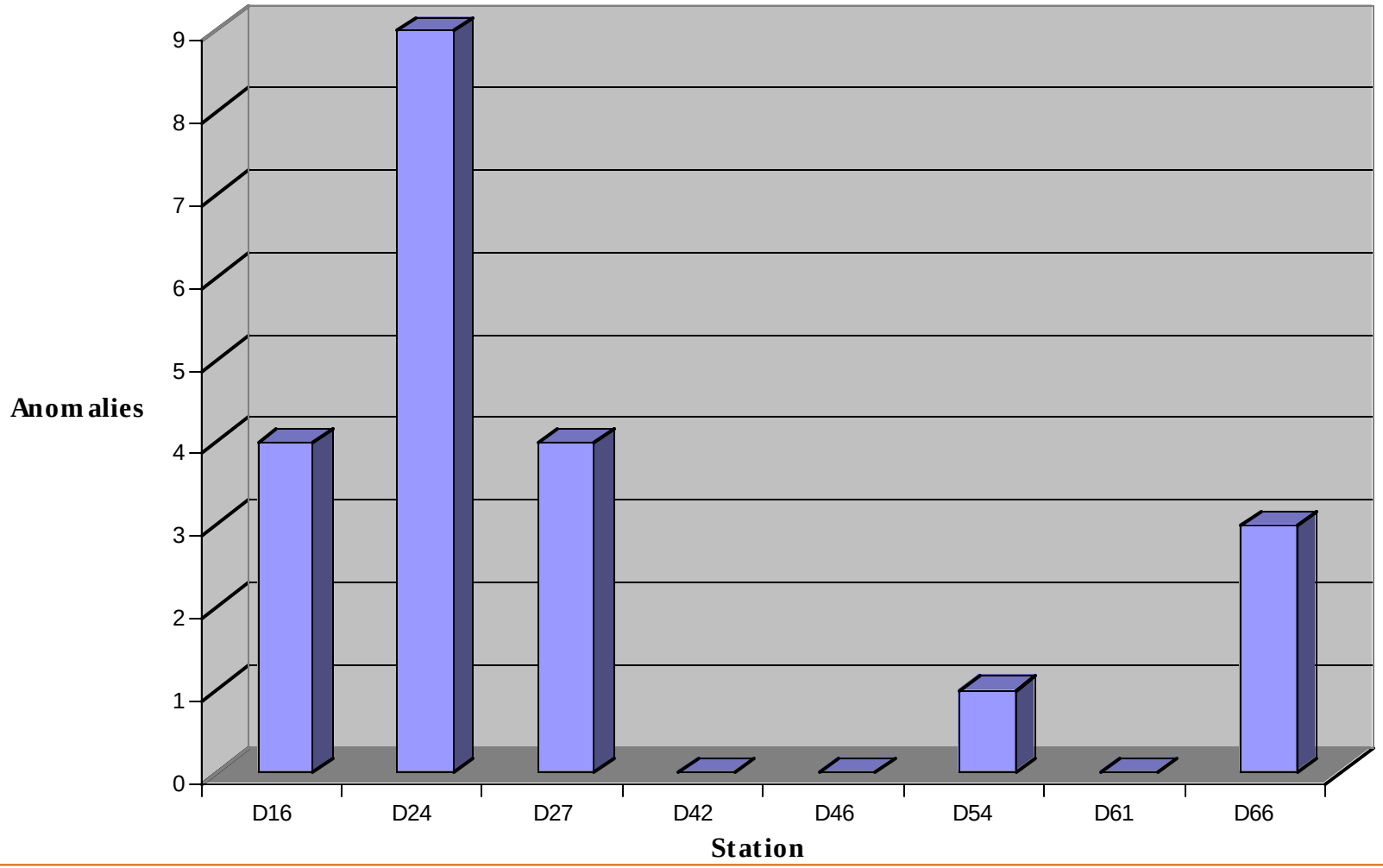
April 19, 2001

MONTHLY SPACECRAFT & PAYLOAD STATUS

- ACE spacecraft and subsystems are operating nominally. Command testing for the 34M system has been successful. The DSN anomaly chart is included for the period January to April 1st. The maneuvers in March were successful.

Joint Users Resource Allocation Planning Committee

ACE DSN Anomalies Jan - April 01



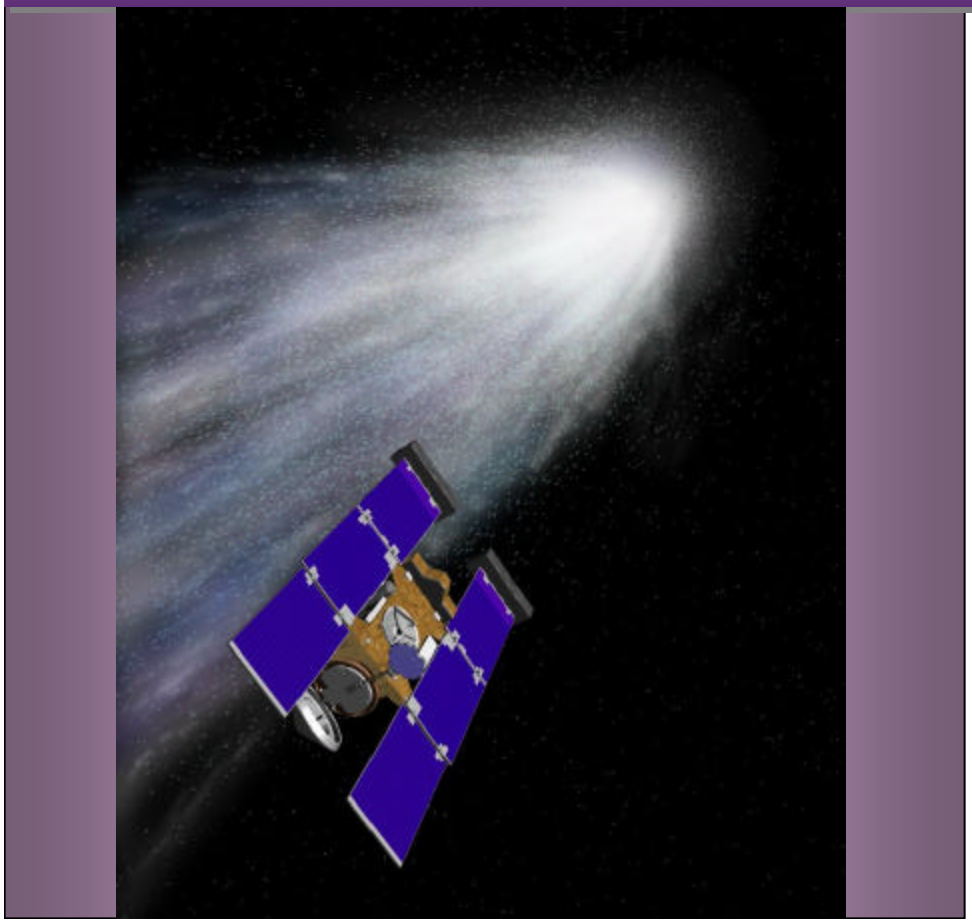
ISSUES

- **CAST TOOL - FOR 23 MONTHS (AND CONTINUING TO COUNT) GSFC HAS ATTEMPTED TO PUT THE JPL CAST TOOL IN THE HANDS OF OUR SCHEDULERS IN ORDER TO APPROVE CONFLICT RESOLUTION EFFICIENCY. THIS IS STILL A CONTINUING ISSUE!!!**
  - **We are still are not using the tool yet or have the training for our DSN schedulers!!!**
  - **Current issue is obtaining accounts for the GSFC schedulers which is holding up everything. What's Next?**

- **Continuing line problems have caused degraded data to be received at GSFC.**

- **After the second week of March, the number of DSN anomalies have gone down somewhat during mission supports**

STARDUST Project



JOINT USERS
RESOURCE ALLOCATION
PLANNING COMMITTEE

R. E. Ryan
April 19, 2001
NASA Jet Propulsion Laboratory

http://stardust.jpl.nasa.gov

STARDUST

Report to JURAP

STATUS

- **SPACECRAFT IS HEALTHY (4/19/01)**
- **PRESENTLY 0.47 AU from EARTH**
  - **00:07:47 RTLT**
  - **1.4 AU from SUN**

- **A spacecraft safemode occurred on March 20 when moving from CIDA observing to Earth comm attitude.**
  - **–Incorrect attitude error-checking parameter value.**
  - **–Safe-mode exit was within 4 hours after an assessment of the status and cause.**
  - **–CIDA collection attitude suspended for 2 weeks while fix was implemented.**

STARDUST

Report to JURAP

- **NAVCAM (Camera) CALIBRATION ACTIVITY ON-GOING**
  - **Some additional (or re-deposit of) contamination on the camera optics was seen during calibration in late February.**
  - **Currently in a longer term heating cycle, which to date appears to have improved the optics clarity to the best since launch, but still not quite to pre-launch standard.**
  - **Calibration of the camera, mirror and periscope proceeding.**

- **TMOD SUPPORT HAS GENERALLY BEEN GOOD THIS PERIOD**
  - **Heavy solar activity has been worrisome, but the spacecraft has not been affected, so far.**

STARDUST

Report to JURAP

CHECK OUT THE HOMEPAGE

http://stardust.jpl.nasa.gov

ONGOING EVENTS:

CIDA Interstellar Collection Period #2 (3/16 to 8/8/01)

DSM-2 (TCM-7) March 13, 2002

VOYAGER

FLIGHT OPERATIONS

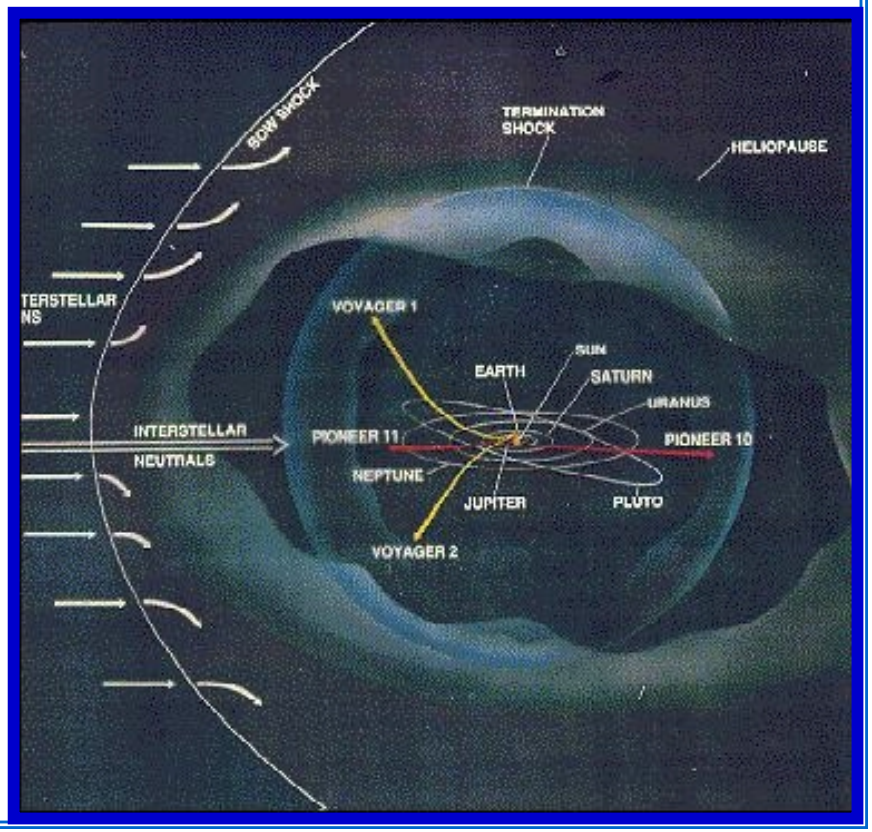
JOINT USERS RESOURCE ALLOCATION PLANNING COMMITTEE

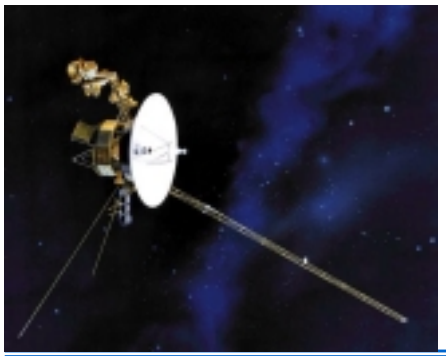
J. C. Hall, Jr.

March 15, 2001

NASA Jet Propulsion Laboratory

http://vraptor.jpl.nasa.gov





VOYAGER
FLIGHT OPERATIONS

FLIGHT SYSTEM STATUS

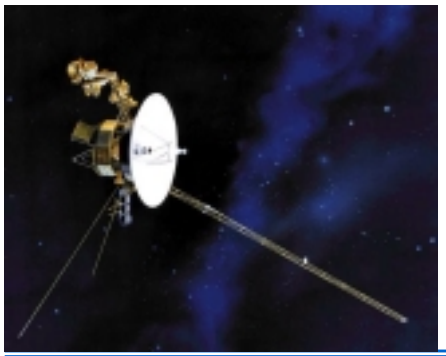
MISSION STATUS

VOYAGER 1

*** HELIOCENTRIC DISTANCE – 80.8 AU, RTLT – 22h14m32s**
SPACECRAFT REMAINS HEALTHY
RTLT = 24h00m00s in 2002-280/06:57:54 (10/7/02)

VOYAGER 2

*** HELIOCENTRIC DISTANCE – 63.7 AU, RTLT – 17h38m32s**
SPACECRAFT REMAINS HEALTHY
MAJOR ACTIVITY - ASCAL, MAGROL



VOYAGER
FLIGHT OPERATIONS

GROUND SYSTEM STATUS
(March 10, 2001 - April 13, 2001)

DSN - OVERALL SUPPORT – GOOD

TOTAL SUPPORT TIME, OUTAGE TIME, % of OUTAGE TIME

S/C	SCHED SUPPORT	ACTUAL SUPPORT	70M TIME	SIGNIFICANT OUTAGE TIME	% of OUTAGE TIME
31	535.6	530.4*	313.2	0.0 (1.9)	.36
32	309.7	310.9**	69.1	13 (0.2)	4.25

***Released 2.5 hours of DSS-25 support to DS-1; substituted 5.1 hours of DSS-54 support in place of 7.8 hours of DSS-63 (down due to a red antenna)**

****Substituted 6.0 hours of DSS-43 support in place of 4.8 hours of DSS-45 in order to perform BLF checks**

VOYAGER HOMEPAGE - http://vraptor.jpl.nasa.gov

Joint Users Resource Allocation Planning (JURAP)

Committee Meeting

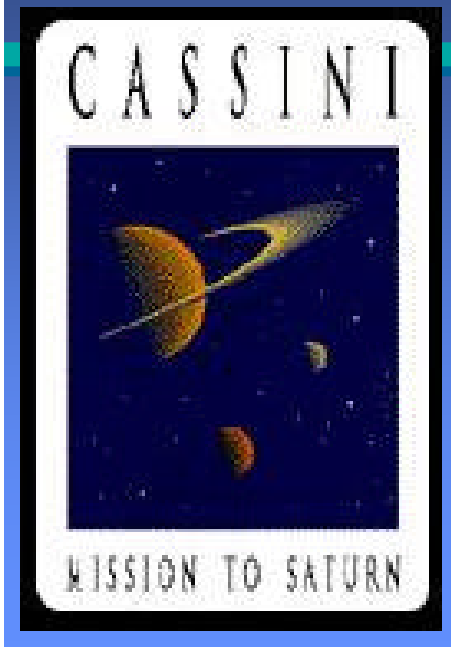
Dave Doody

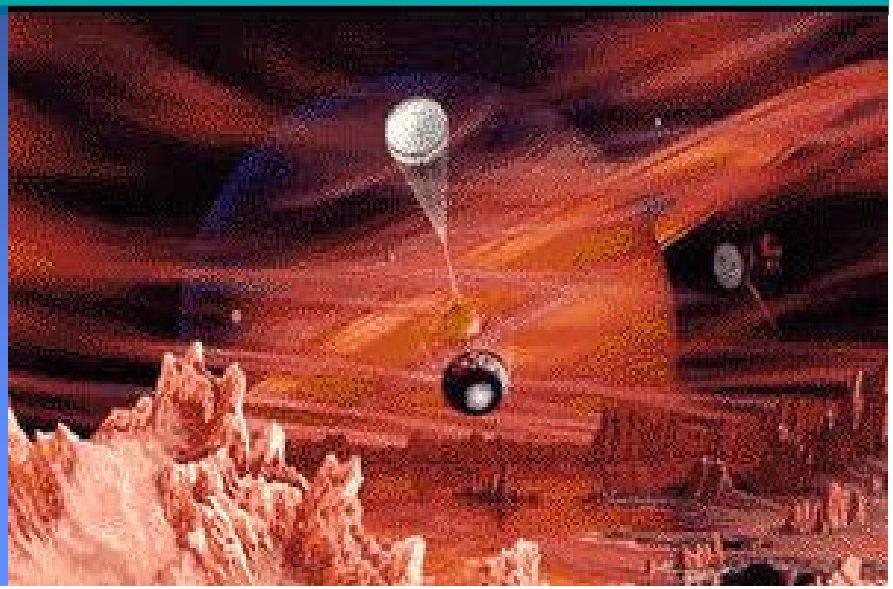
April 19, 2001

NASA Jet Propulsion Laboratory

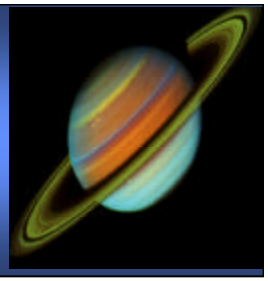
CASSINI

http://www.jpl.nasa.gov/cassini/





CASSINI



- Jupiter Science Mission Subphase Ends 29 April 2001
  - Spacecraft is pointed HGA-to-Earth except for specific short activities
- Quiet Cruise Mission Subphase Begins 30 April 2001
  - Just how “Quiet” is To Be Determined!
  - Science Cruise Phase begins with Space Science Subphase 8 July 2002.
- Operations are Basically Nominal
  - Excellent DSN support, especially with the Radio Science Ka-band tests.
  - Minor S/C instrument anomalies still being worked and recovered near real time.
  - Huygens Probe link anomaly resolutionrequires more S-band Uplink tests with DSN.
  - One DSN problem remains: 1-Way Doppler unusability, per ISA Z70911
- Continuing to Prepare for Gravitational Wave
  - System Tests May & August 2001,
  - Experiment 26 November — 4 December 2001.
  - Additional Experiments yearly until Saturn Arrival

JPL Mars Global Surveyor

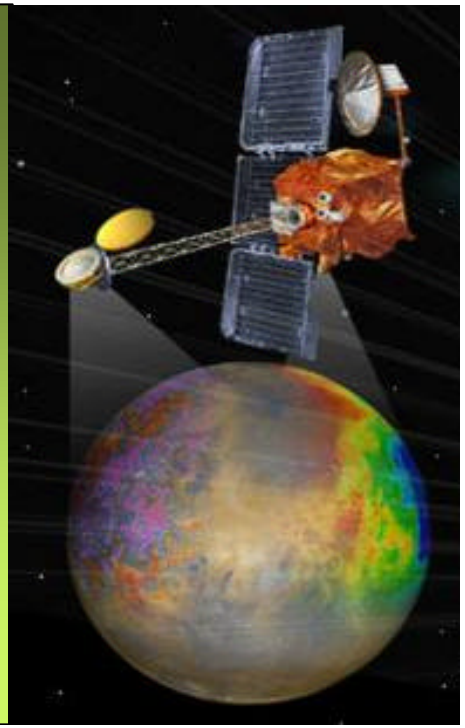
Mars Mission Management Office

Presentation to the

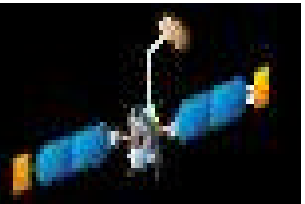
Joint Users Resource Allocation Planning (JURAP) Meeting

April 19, 2001

E. E. Brower

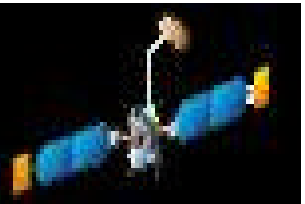


http://mars.jpl.nasa.gov/missions/present/globalsurveyor.html



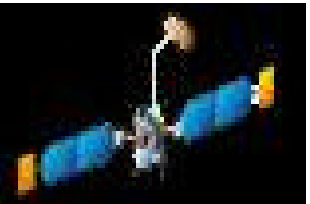
AGENDA

- Color Status
- Recent Events
- Latest Orbital Numbers
- Upcoming Events
- Issues



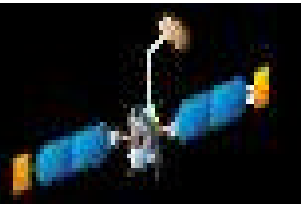
COLOR STATUS

	JAN	FEB	MAR
• FLIGHT OPERATIONS			
–SPACECRAFT	G	G	G
–NAVIGATION	G	G	G
–MISSION PLAN/SEQUENCE	G	G	G
• SCIENCE	G	G	G
• FLIGHT SUPPORT			
–GROUND DATA SYSTEM	G	G	G



RECENT EVENTS

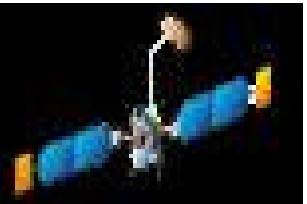
• Began Beta-supplement operations	FEB 7, 2000
• Completed 1 year of mapping	MAR 9
• 2nd mapping archive delivery (25,000 images)	MAY 22
• Solar conjunction	JUNE 25-JULY 9
• Extended Mission full authorization	OCT 16
• First year mapping archive completed (55,000 images)	OCT 31
• Extended Mission Target ORT	DEC 4-5
• Campaign F (TES/RS coincident atm. obs.)	DEC 9-DEC 21
• RS egress occultation maneuvers	DEC 20, JAN 10,
• MOLA polar scan	JAN 18
• DDOR observations	JAN 9, 13, 24, 27
• EOPM	JAN 31 (PST)
• ROTO demonstration	FEB 16
• MER SITE imaging began	FEB 19
• Radio Science Egress Scans	APR 4,5



LATEST ORBITAL NUMBERS

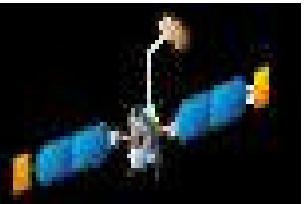
- **Launch / Days since Launch = Nov. 7, 1996 / 1610 days**
- **Start of Mapping / Days since Start of Mapping = April 1, 1999 / 734 days**
- **Total Mapping Orbits = 9,272**
- **Total Orbits = 10,955**

(as of April 4, 2001)



UPCOMING EVENTS

• Planetary quarantine study complete	APR
• 18 month archive complete	APR 30
• Thruster/fuel strategy review	MAY 1
• UHF Test (tbs)	JUN
• 2nd Extension proposal	JUN 15
• Beta supplement ends	JUN 22
• NASA approval Extended Extended Mission	OCT 1
• Second year mapping archive complete	OCT 30
• Selection of Extended Extended mission plan	JAN 30, 2002
• End of extended mission	APR 22
• Begin relay storage (option 1)	MAR 2003
• MER EDL	JAN-FEB 2004
• End of E2 Extended Extended operations (tbd)	JUN 2004



UNCERTAINTIES

MGS is unable to submit firm requests for future DSN Coverage requirements due to the uncertainties of pending requirements from the Mars 2001 Odyssey Spacecraft to support aero-braking, and MER spacecraft to support EDL. An ongoing effort continues to firm up these requirements so MGS can submit the best information at the earliest point in the process as possible.

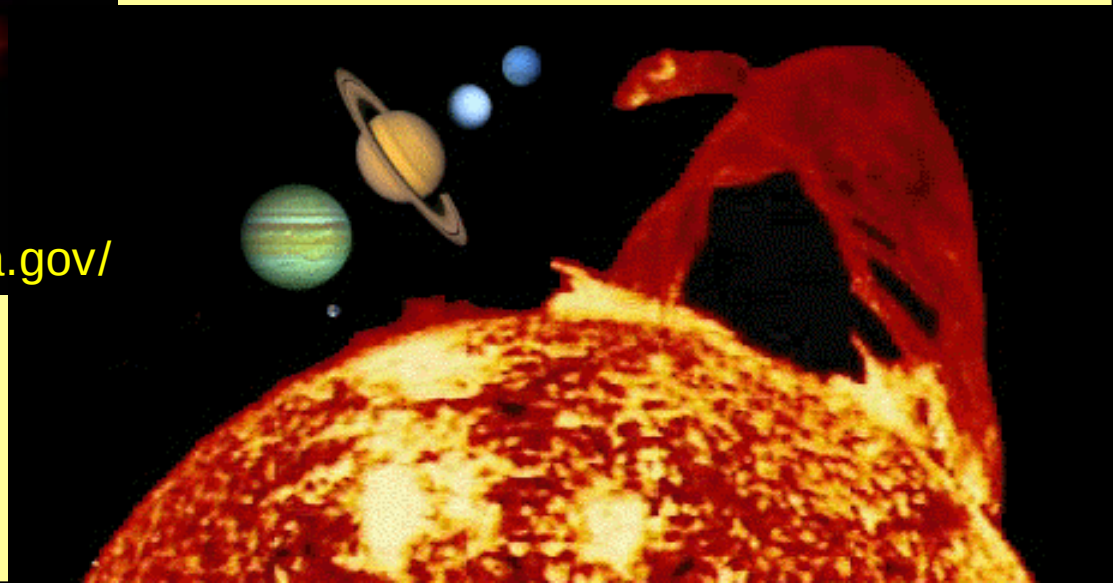
ulysses

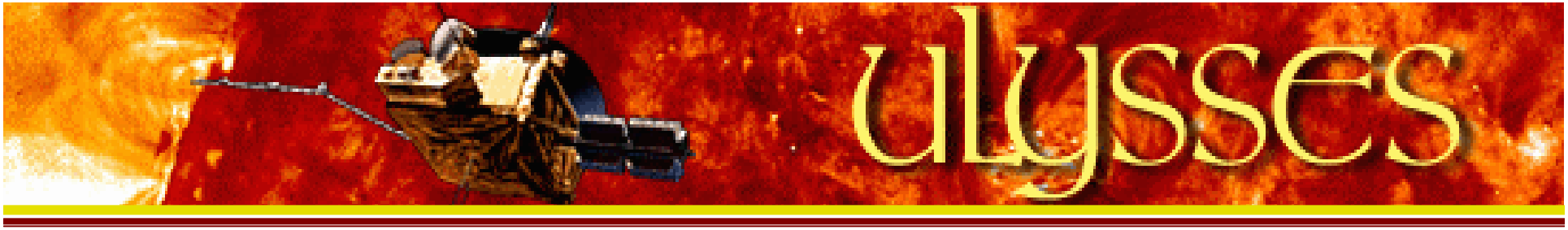
JOINT USERS RESOURCE ALLOCATION PLANNING COMMITTEE

I. J. Webb

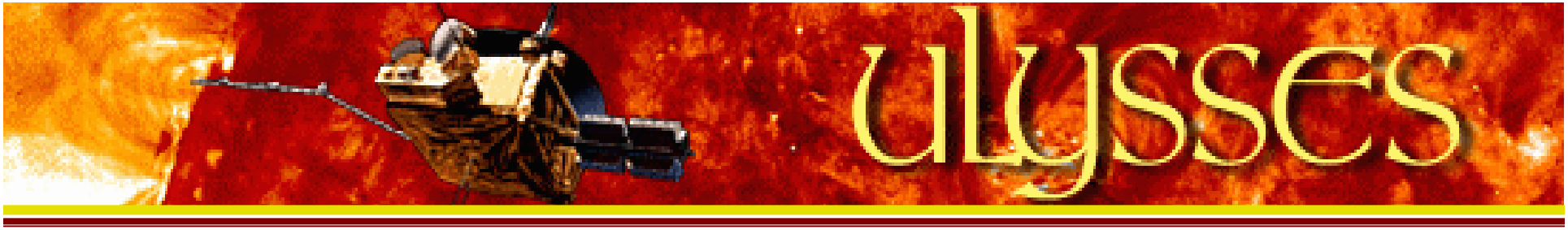
April 19, 2001

NASA Jet Propulsion Laboratory





- **Spacecraft operations are normal. The spacecraft is in it's second orbit around the sun and is currently in nutation operations. Instrument calibrations and reconfigurations are performed as required.**
- **DOY 082 - DSS 73 left circular polarization on initial uplink. No spacecraft lock and delayed conscan on CMD for 50 minutes.**
- **DOY 088 - An open loop "McElrath" maneuver was successfully employed in response to high nutation levels (1.2 degrees) following the Kourou support.**
- **DOY 088/89 - DSS 24 declared RED - Azimuth wheel bearing failure. DSS 14 replaced DSS 24 on DOY 088 (Thank you DSS 14!). On DOY 089 only DSS 74 was available for uplink and DSS 15 for downlink. DS 74 had uplink power fluctuations and nutation grew to 1.05 degrees. Two McElrath maneuvers were executed within 1-1/2 hours to reduce nutation to normal levels (.15 degrees).**



- DOY 093 - DSS 34, three uplink CMD modulation pertubations (on/off/on), one with CLC off and two with CLC on. Nutation rose from .05 to .2 degrees. Recovery took 10 hours.
- DOY 100/101 - DSS 34, three uplink CMD modulation pertubations (on/off/on) caused nutation levels to reach a high of .35 degrees. Performed two McElrath maneuvers to reduce nutation to normal levels.
- DOY 102 - DSS 54 S-band transmitter tripped off due to blown fuse in power supply. Re-established uplink 1 hour and 45 minutes later. Nutation was controlled due to CLC being off just prior to the outage time.
- DOY 104 - DSS 14 multiple CMD modulation pertubations, due to repeated CMD verification alarms. A McElrath maneuver was executed to control nutation.
- DOY 107 - An open loop McElrath maneuver was successfully employed in response to high nutation levels (0.2 degrees).

International Solar Terrestrial Physics

exploring the Sun-Earth connection

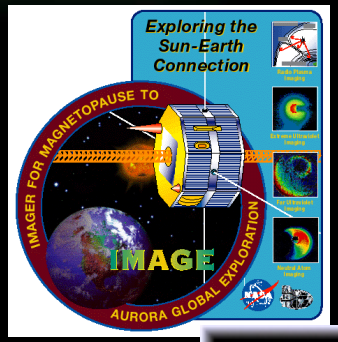
ISTP

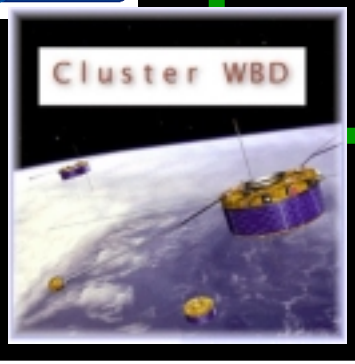
Joint Users Resource Allocation Planning Committee (JURAP)

Albert Chang

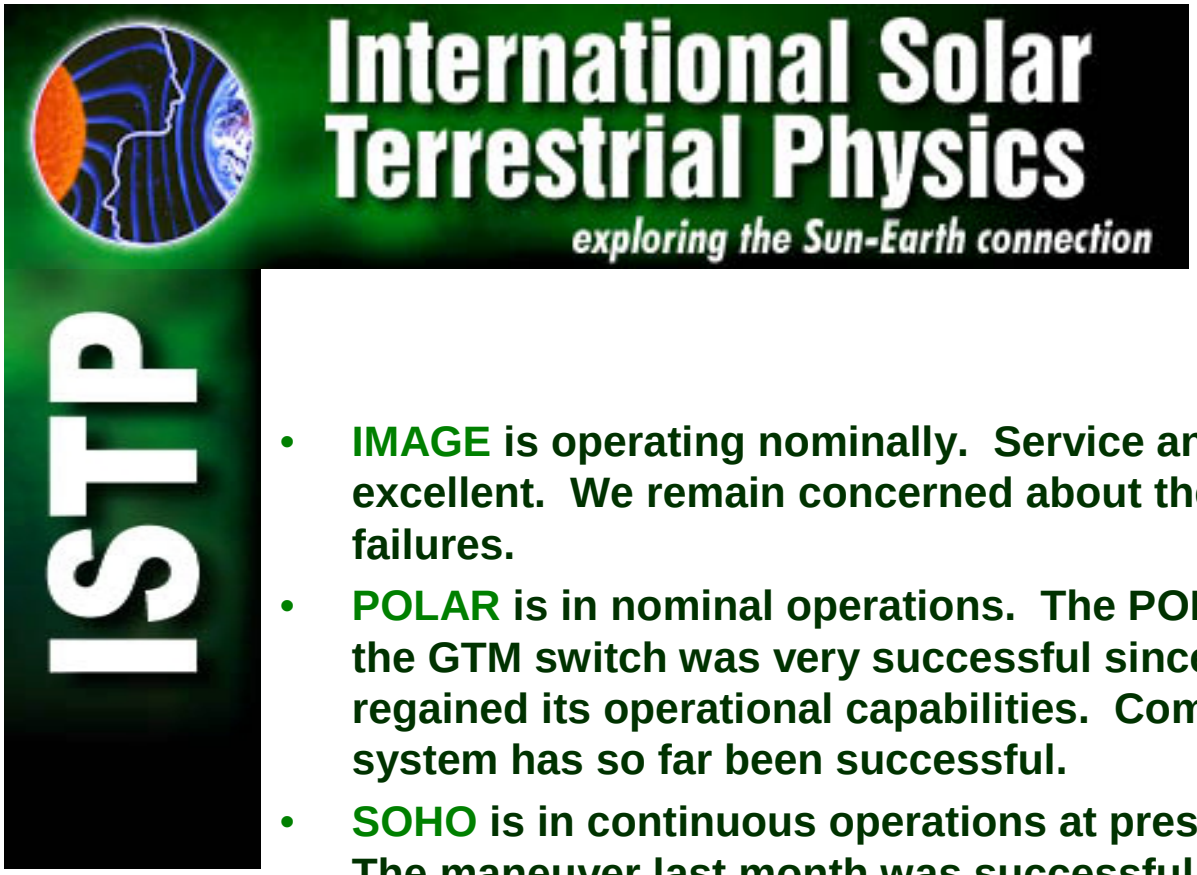
April 19, 2001

NASA Jet Propulsion Laboratory





http://www-istp.gsfc.nasa.gov/istp/



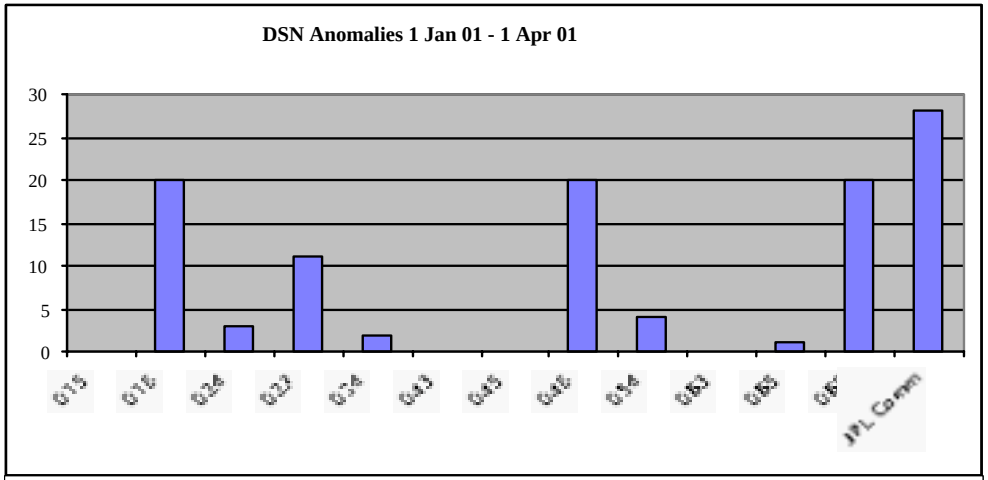
- **IMAGE is operating nominally. Service and data collection rates are excellent. We remain concerned about the rate of DSN site hardware failures.**
- **POLAR is in nominal operations. The POLAR flip was successful and the GTM switch was very successful since the TIMAS instrument regained its operational capabilities. Command testing for the 34M system has so far been successful.**
- **SOHO is in continuous operations at present and is operating normally. The maneuver last month was successful. The DSN anomaly chart is included for March. Command testing for the 34M system has so far been successful. DSN site hardware failures are of concern during continuous operations.**
- **WIND has been operating nominally. Spacecraft maneuver was successful at the beginning of April.. Command testing for the 34M has so far been successful.**

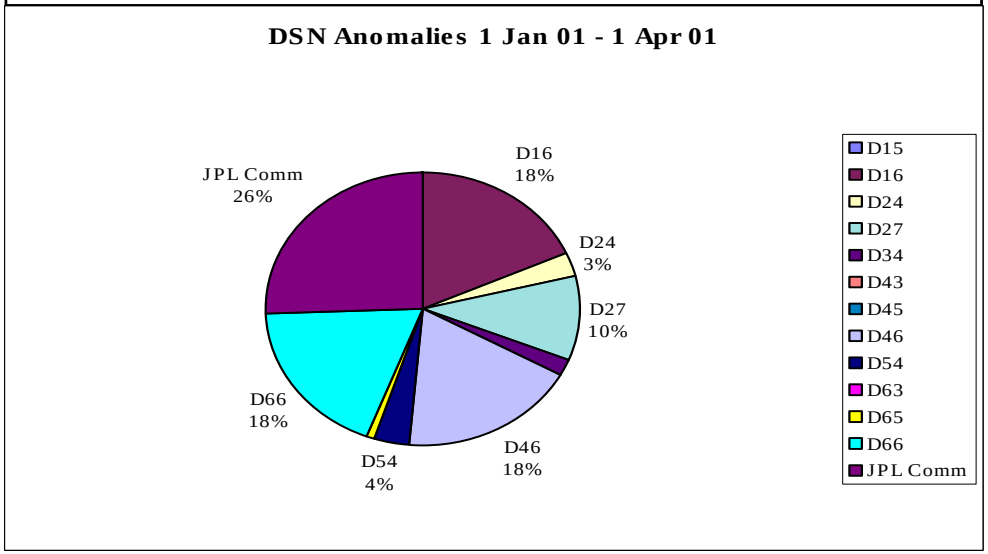
International Solar Terrestrial Physics

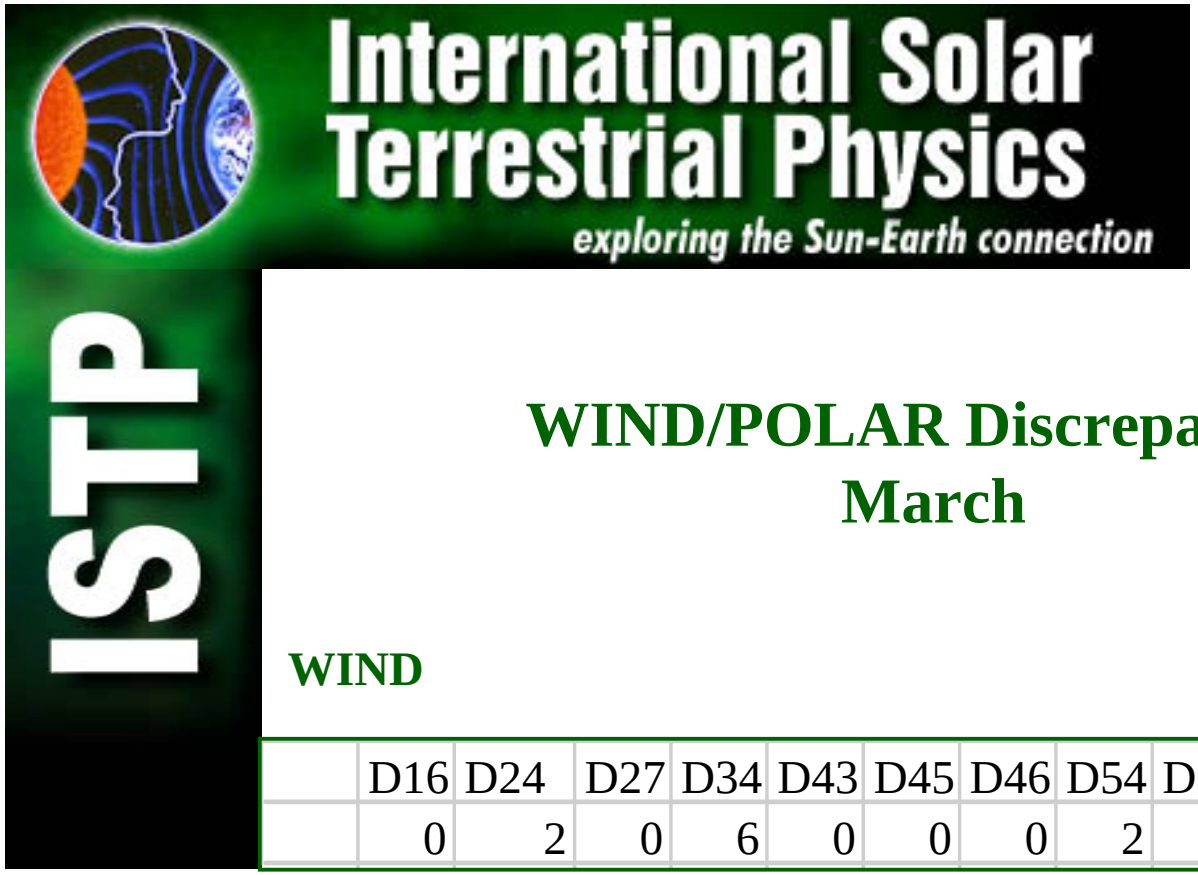
exploring the Sun-Earth connection

ISTP

SOHO DSN ANOMALY COUNT THIS YEAR







WIND/POLAR Discrepancies
March

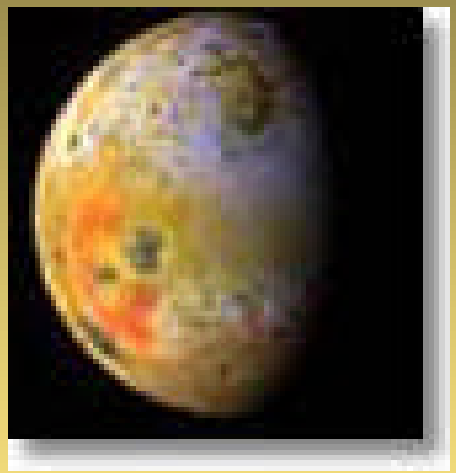
WIND

	D16	D24	D27	D34	D43	D45	D46	D54	D63	D65	D66	JPL Comm	Total
	0	2	0	6	0	0	0	2	0	0	0	0	10

POLAR

	D16	D24	D27	D34	D40	D45	D46	D54	D63	D65	D66	JPL Comm	Total
	1	2	1	1	1	0	0	2	0	0	2	0	10

JOINT USERS RESOURCE ALLOCATION PLANNING COMMITTEE



Brad Compton

April 19, 2001

NASA Jet Propulsion Laboratory

http://galileo.jpl.nasa.gov/

Galileo
Millenium Mission

SIGNIFICANT EVENTS

- **Cancelled OTM-93, an apojove maneuver - not needed**
- **Lost two DSS 43 passes due to labor dispute**
- **Continued Ganymede 29 encounter data playback**

PROJECT PLANS

- **Complete Ganymede 29 playback**
- **Next encounter Callisto 30 (25 May)**

Joint Users Resource Allocation Planning Meeting

Jim Taylor (for K. Moyd)

April 19, 2001

JPL

SPECTRUMASTRO

DS1 STATUS

Previous Month's Activities and Current Status

- Regular anchor tracks Earth-pointed and rest of time at thrust attitude through January.
- During February, the thrust attitude allowed the HGA to be pointed at Earth.
- The M6F3 version of flight software was uplinked starting March 5, 2001.
- The spacecraft was rebooted to switch to the new software as planned on March 13.
- Activity made more exciting by a ~ 4hour downlink outage on DSS-14.
- Also determined that the spacecraft sensitivity to offsets in the uplink subcarrier frequency from best value is probably greater than anticipated. Probably caused some commands to be missed.
- Attitude re-determination was completed by March 20.
- A couple of DSS-14 tracks at the end of the flight software upload period were traded for 34-meter tracks so DSN K-band testing using the DS1 signal could be done at DSS-14.
    - This activity was not done because the existing equipment at DSS-14 could not handle DS1's low signal level. Testing was done using Cassini.

JPL

SPECTRUMASTRO

Telecom-related problems from January 15 through April 15.

- **February 6 DSS-43 transmitter failure occurred during our track. Transmitter not available for several weeks.**
- **Less impact than usual because we could uplink and get telemetry verification during our “midweek” tracks.**
- **Determined that commanding is not compatible with ranging using 9 db carrier suppression.**
- **Missed a command during one track. Did some testing during the next track confirming the likely cause.**
- **False checksum errors in the Command System on some of the long files during the flight software load slowed down the uplinking and led to some operational errors.**
- **Track on March 11 was started using the wrong uplink polarization. Fortunately it was corrected in time to allow us to re-uplink the planned cancellation of the sequenced switch to the LGA (AKA “lifeboat”).**

JPL

SPECTRUMASTRO

Telecom-related problems from January 15 through April 15.

- February 6 DSS-43 transmitter failure occurred during our track. Transmitter not available for several weeks.
- Less impact than usual because we could uplink and get telemetry verification during our “midweek” tracks.
- Determined that commanding is not compatible with ranging using 9 db carrier suppression.
- Missed a command during one track. Did some testing during the next track confirming the likely cause.
- False checksum errors in the Command System on some of the long files during the flight software load slowed down the uplinking and led to some operational errors.
- Track on March 11 was started using the wrong uplink polarization. Fortunately it was corrected in time to allow us to re-uplink the planned cancellation of the sequenced switch to the LGA (AKA “lifeboat”).
- For a number of reasons ranging data was lost on many tracks after our software reboot – failed transmitter, Canberra walkout, wrong parameter causing bad tune, wrong round-trip-light-time entered.
  - Result of loss was poor pointing predicts for a couple of passes. (Conscan improved signal by ~7 db)

JPL

SPECTRUMASTRO

Near Term Plans

- Opportunistic use of Jupiter on May 1 for testing some key encounter-type processing in a realistic mode. (Rehearsals use simulated comet images superimposed on actual images.)
- First encounter rehearsal May 8.

Long Term Plans

- Thrusting needed to reach Comet Borrelly continues until early June, 2001.
- Because of the significant decrease in use of hydrazine while thrusting, we will be thrusting even during planned "coast" time. The strategy is to alternate between a "North" star and a "South" star.
- Second encounter rehearsal scheduled for the week of June 19.
- Comet Borrelly encounter will occur September 22, 2001.
- Time of the encounter is being controlled so as to work around the unavailability of DSS-63. Also taking into account overlap in view periods between DSS-14 and 43 for critical activity.

JPL

SPECTRUMASTRO